**The answers for the reviewer A:**

1. Page 1, line 10, replaced “…RIM process (moulding by injection-reaction)…” by “…reaction injection moulding (RIM) process…”.

Yes, I agree, The “…RIM process (moulding by injection-reaction)…” is replaced by “…reaction injection moulding (RIM) process…” in the manuscript.

1. defined abbreviations used in Abstract and Manuscript.

yes, I agree, the abbreviations used in the Abstract and in the Manuscript should be defined, so, for more details:

Page 1, line 19, PUR 3: polyurethane formulation r == 1.15

Page 1, line 18, PUR4: polyurethane formulation r == 1.15 with 0.97% of diamino-1,2 propane.

For the two abbreviations (PUR 3 and PUR 4) is cited indirectly in the experimental part and added in the abstract.

Page 1, line 15, **IRTF** was replaced with **FTIR**: Fourier transform infrared spectroscopy

Page 1, line 16, SEM: Scanning electron microscope

PUR4 + 2% OMMT: polyurethane formulation r == 1.15 with 0.97% of diamino-1,2 propane and 2% of organo-modified montmorillonite .

Page 3, line 59, SAN: styrene acrylonitrile

Page 3, line 60, POPE: polymer polyether polyol

Page 1, line 10, RIM: reaction injection moulding

Page 1, line 10, CPP: copolymer polyol

This correction was added in the abstract and experimental part.

The previous abstract was:

*Abstract:* In this work, we propose a novel method of elaboration nanostructured foams polyurethane/Organo-modified Montmorillonite (PUR/OMMT) elaborated by in situ polymerization using a twin-screw extruder in contrarotative mode combined with RIM process (moulding by injection-reaction) with an appropriate montage. The blended polyols (CPP) were included between the OMMT layers via the twin-screw extruder. The formulation of the PUR and the inter-foliar distance in the montmorillonite (MMT) both have been optimized. The effect of some parameters such as MMT content and catalyst were also undertaken. The synthesized materials (OMMT, PUR and PUR/ OMMT) were characterized by different methods; IRTF spectroscopy, X-ray diffraction and SEM for only PUR/OMMT. The evaluation tests like flammability according to UL 94 and the tensile test were carried out. In view of the obtained results, the PUR 4 foam admits mechanical and flame-retardant properties better than the PUR 3 foam. However, the PUR 4 + 2% OMMT formula exhibits the most delayed flame diffusion and pronounced stiffness.

The previous materials part was:

Polyether polyols grafted with 10% of SAN molecules, called CPP or POPE supplied by Confortchem. Polymeric methane diphenyl diisocyanate (PMDI) supplied by the company BASF. Triethylenediamine (A-33) used as catalyst purchased from Struktol. Glycerol (C3H8O3) from Panreac, Silicone L-580 from Niax, Dichloromethane (CH2Cl2,99.8%) from AcroSeal. Diamino-1,2-propane (C3H10N2, >98%) and sodium chloride (NaCl, 99%) purchased from [Sigma-Aldrich](http://www.sigmaaldrich.com/catalog/product/aldrich/773204). Hydrochloric acid (HCl, 35-37%) purchased from Biochem. Hydrogen Dioxide (H2O2, 10V) from Saidal and the intercalating agent Octadecylamine (ODA, 90%) from Fluka. Foundry bentonite (BNT), unearthed from Hammam-Boughrara layer of Maghnia, was kindly supplied by bental.

The corrected abstract is after:

*Abstract:* In this work, we propose a new method of elaboration nanostructured foam polyurethane/ Organo-modified Montmorillonite (PUR/ OMMT) elaborated by in situ polymerization using a twin-screw extruder in contrarotative mode combined with reaction injection moulding (RIM) process with an appropriate montage. The blended polyols, copolymer polyol (CPP) were included between the OMMT layers via the twin-screw extruder. The formulation of the PUR and the inter-foliar distance in the montmorillonite (MMT) both have been optimized. The effect of some parameters such as MMT content and catalyst was also undertaken. The synthesized materials (OMMT, PUR and PUR/ OMMT) were characterized by different methods; Fourier transform infrared spectroscopy FTIR spectroscopy, X-ray diffraction (XRD) and Scanning electron microscope (SEM) for only PUR 3/ OMMT. The evaluation tests like flammability according to UL 94 and the tensile test were carried out. In view of the obtained results, the PUR 4 (r == 1.15 with 0.97% of diamino-1,2 propane) foam admits mechanical and flame-retardant properties better than the PUR 3 (r == 1.15) foam. However, the PUR 4 + 2% OMMT formula exhibits the most delayed flame diffusion and pronounced stiffness.

The corrected materials part is after:

### Polyether polyols grafted with 10% of styrene acrylonitrile (SAN) molecules, called copolymer polyol (CPP) or polymer polyether polyol (POPE) were supplied by Confortchem. Polymeric methane diphenyl diisocyanate (PMDI) was supplied by the company BASF. Triethylenediamine (A-33) used as a catalyst was purchased from Struktol. Glycerol (C3H8O3) from Panreac, Silicone L-580 from Niax, Dichloromethane (CH2Cl2,99.8%) was supplied by AcroSeal. Diamino-1,2-propane (C3H10N2, >98%), sodium chloride (NaCl, 99%), [Ammonium acetate (NH4 OAc, C2H7NO2, ≥98%](https://www.sigmaaldrich.com/catalog/product/sigma/a1542?lang=en&region=US)) and ‎Chlorure de potassium (KCl, 99%) was purchased from [Sigma-Aldrich](http://www.sigmaaldrich.com/catalog/product/aldrich/773204). Hydrochloric acid (HCl, 35-37%) was purchased from Biochem. Hydrogen Dioxide (H2O2, 10V) from Saidal and the intercalating agent Octadecylamine (ODA, 90%) were obtained from Fluka. Foundry bentonite (BNT), unearthed from Hammam-Boughrara layer of Maghnia, was kindly supplied by bental.

1. Page 2, line 70, Determinate the cation exchange capacity (CEC) of the purified montmorillonite and present the used ratio of modifier (protonated octadecylamine) and CEC of MMT.

Yes , I agree.

The cation exchange capacity (CEC) of the sodium montmorillonite (MMT-Na+) was determined by saturated this MMT-Na+ by NH4+ using ammonium acetate (NH4OAc) 1 mol/L at pH=7. Excess salt was removed by washing with an ethanol-water mixture. Next, the NH4+ was displaced by K+, which was applied as a 10% KCl solution at pH=2.5. The amount of NH4+, representing the CEC. (Leij and Dane, 1989) we obtained a value of 1 mmol/g CEC. The protocol of the Organo-modified Montmorillonite is effected using a 2-CEC ration of the Octadecylamine / MMT.

The previous Bentonite Treatments part was:

*Bentonite Treatments*

The purification of the BNT consists in the elimination of all the impurities like quartz and calcite, then extract the MMT, by carrying various physicochemical treatments.

In order to extract MMT and remove the quartz particles present in the BNT, we sediment the suspension (BNT/water, 10% Wt) during 70 hours; the aqueous solution was centrifuged in order to recover the MMT. The recovered MMT was treated with 0.1M HCl (10 g of MMT immersed in 250 ml of 0.1M HCl) at room temperature for 4 hours. Followed by H2O2 (10V) treatment; when 10 g of MMT dispersed in 500 ml of H2O2 for 24 hours tracked by heating at 70°C for 30 min.

For the purpose of uniformed the surface of MMT, a cation exchange is necessary.  In our case, we proceed as follows: 10 g of the purified MMT are dispersed in 500 ml of NaCl solution 0.5 N at 70°C for 4 hours. The operation is repeated three times to reach the saturation of the MMT by the sodium cations and the obtention of sodium montmorillonite MMT-Na+. Finally, in the aim to modify the hydrophilic nature of the MMT-Na+, alkylammonium ions are used ODA.

The grafting of the ODA into MMT is as follows: 10-2 moles of the ODA was introduced in 1 L of 0.01N HCl at 80°C under mechanical stirring. After three hours, 5 g of MMT-Na+ was added. After 20 hours of cation exchange, the suspension was filtered and washed with distilled water at 80°C. In order to eliminate the physisorbed alkylammonium, the MMT was washed after removal of the chloride ions by a water/ethanol mixture, previously heated to 70°C. When the suspension is completely filtered, dried at 85°C, crushed and sifted it is stored in a desiccator.

The corrected Bentonite Treatments part is after:

*Bentonite Treatments*

The purification of the BNT consists in the elimination of all the impurities like quartz and calcite, then extract the MMT, by applying various physicochemical treatments.

In order to extract MMT and remove the quartz particles present in the BNT, we sediment the suspension (BNT/water, 10% Wt) during 70 hours; the aqueous solution was centrifuged in order to recover the MMT. The recovered MMT was treated with 0.1M HCl (10 g of MMT immersed in 250 ml of 0.1M HCl) at room temperature for 4 hours. Followed by H2O2 (10V) treatment; when 10 g of MMT dispersed in 500 ml of H2O2 for 24 hours tracked by heating at 70°C for 30 min.

In order to obtain uniform MMT surface, a cation exchange is necessary.  In our case, we proceed as follows: 10 g of the purified MMT are dispersed in 500 ml of NaCl solution 0.5 N at 70°C for 4 hours. The operation is repeated three times to reach the saturation of the MMT by the sodium cations and the obtention of sodium montmorillonite MMT-Na+. Finally, in the aim to modify the hydrophilic nature of the MMT-Na+, alkylammonium ions are used ODA.

The cation exchange capacity (CEC) of the MMT-Na+ was determined by saturated this MMT-Na+ by NH4+ using ammonium acetate (NH4OAc) 1 mol/L at pH=7. Excess salt was removed by washing with an ethanol-water mixture. Next, the NH4+ was displaced by K+, which was applied as a 10% KCl solution at pH=2.5. The amount of NH4+, representing the CEC 34. We obtained a value of 1 mmol/g CEC.

The grafting of the ODA into MMT is effected using a 2-CEC ration (ODA/MMT) as follows: 10-2 moles of the ODA were introduced in 1 L of 0.01N HCl at 80°C under mechanical stirring. After three hours, 5 g of MMT-Na+ was added. After 20 hours of cation exchange, the suspension was filtered and washed with distilled water at 80°C. In order to eliminate the physisorbed alkylammonium, the MMT was washed after removal of the chloride ions with a water/ethanol mixture, previously heated to 70°C. When the suspension is completely filtered, dried at 85°C, crushed and sifted it is stored in a desiccator.

1. Page 5, line 120, Added description of characterization methods

*Yes, I agree*

Characterization method

Fourier transform infrared (FTIR) spectra were recorded between 400 and 4000 cm-1 from KBr pellets on an infrared Fourier transform spectrometer (Shimadzu type 8400 S). X-Ray powder diffraction patterns were recorded on a PANalytical X'Pert PRO diffractometer fitted with CuK*α* radiation (*λ* = 1.5404 nm) at 40 kV and 40 mA in the 4–60° 2*θ* region. The surface morphologies of samples were investigated via scanning electron microscopy (SEM) (FEI pattern Quanta 600 at 15 kV), in order to observe the evolution of the structure of the cell and their sizes after incorporation OMMT. For the preparation of the (SEM) samples, the sample was cut and coated with a thin gold layer, using a Cressington 108 auto sputter coater sputter, with a current intensity of 40 mA, for 30 seconds. The tensile testing of the rigid polyurethane foams was carried out on an LLOYD instrument TM, with a load cell of 20 KN. The crosshead speed was set to 5 mm/min. Samples were cut to Polyhedron dimensions 127 × 10 × 9 mm, the size between the detectors is 50 mm.

1. Add the position of the peaks
2. a. Page 6, line 145, XRD : Add the position of the peaks specific to clays (figure 2) and in the text of the manuscript.

Yes, I agree, the position of the peaks specific to clays was added in the figure 2 and mentioned in the text, and for more details see “*X-Ray diffraction pattern (XRD)”*

The previous commentary and figure was:



Fig 2. XRD Patterns of: a) fondery BNT, b) MMT-Na+ and c) OMMT.

The X-ray diffraction pattern of the fondery BNT, MMT-Na+ and OMMT presented in Fig. 2 confirm the extraction and purification of MMT by the elimination of the peaks specific to quartz and the organophilic modification. The organophilic modification of MMT is confirmed by the increase in the interlayer distance between layers of montmorillonite. After the organophilic modification, the distance between layers of the montmorillonite shifted until reaching 29.3 Å, whereas this distance was only 10 Å for the untreated fondery BNT.

The corrected commentary and figure is after:

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Fig 2. XRD Patterns of: a) fondry BNT, b) MMT-Na+ and c) OMMT.

The X-ray diffraction pattern of the fondry BNT, MMT-Na+ and OMMT presented in Fig. 2 confirm the extraction and purification of MMT by :

* The peaks specific to quartz at 2 = 20, 23.8, 26.6 and 28° is almost eliminated in the MMT-Na+. 40
* The increase in the interlayer distance between layers of montmorillonite, after the organophilic modification. the distance between layers of the montmorillonite shifted until reaching 29.3 Å, whereas this distance was only 10 Å for the untreated fondry BNT.

1. b. Page 13, line 275, XRD : Add the position of the peaks specific to polyurethanes and composites (figure 8) and in the text of the manuscript.

Yes, I agree, the position of the peaks specific to polyurethanes and composites was added in the figure 8, but it already exists in the text, for more details see “*X-Ray diffraction pattern (XRD) figure 8”*

The previous commentary and figure was:



Fig 8. Juxtaposition of the X-ray diffractograms of the PUR 3 + OMMT nanocomposite foams, (a) PUR 3, (b) PUR 3 + 2% OMMT, (c) PUR 3 + 3% OMMT, (d) PUR 3 + 5% OMMT, (e) PUR 3 + 7% OMMT.

The corrected figure is after:

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Fig 8. Juxtaposition of the X-ray diffractograms of the PUR 3 + OMMT nanocomposite foams, (a) PUR 3, (b) PUR 3 + 2% OMMT, (c) PUR 3 + 3% OMMT, (d) PUR 3 + 5% OMMT, (e) PUR 3 + 7% OMMT.

1. Page 6, line 145, Explaine the visibility of the peak near to 2θ = 26° of foundry BNT, MMT-Na+ and OMMT.

The peak near 26° 2θ is visible in the difractograms of foundry BNT, MMT-Na+ and OMMT is explain by the presence of quartz particles and this peak is visibly decreased after isolation of the montmorillonite.2

The previous commentary was:

The X-ray diffraction pattern of the fondry BNT, MMT-Na+ and OMMT presented in Fig. 2 confirm the extraction and purification of MMT by:

* The elimination of the peaks specific to quartz 2 = 20, 23.8, 26.6 and 28° in the MMT-Na+.
* The increase in the interlayer distance between layers of montmorillonite, after the organophilic modification. the distance between layers of the montmorillonite shifted until reaching 29.3 Å, whereas this distance was only 10 Å for the untreated fondry BNT.

The corrected commentary is after:

The X-ray diffraction pattern of the fondry BNT, MMT-Na+ and OMMT presented in Fig. 2 confirm the extraction and purification of MMT by :

* The peaks specific to quartz at 2 = 20, 23.8, 26.6 and 28° is almost eliminated in the MMT-Na+.40
* The increase in the interlayer distance between layers of montmorillonite, after the organophilic modification. the distance between layers of the montmorillonite shifted until reaching 29.3 Å, whereas this distance was only 10 Å for the untreated fondry BNT.

1. Page 6, line 145: XRD for foundry BNT, MMT-Na+ and OMMT

a. Yes, I agree, the position of the peak near 6° 2θ corresponds to the basal spacing not  
distance between layers, but, since this peak was not detected for 2 θ superior to 6°, the distance between layers of the montmorillonite shifted until reaching 29.3 Å.

b. The shift of the peak at lower 2θ values after the purified and treated with NaCl of foundry BNT is likely be attributed to the aggressive ion exchange of the calcium cations (Ca2+ = 100 pm) by sodium cations (Na+ = 102 pm), which is bigger than calcium cations. This increase in d001-spacing of MMT-Na+ was previously found by D. E. Kherroub and al.41

The previous commentary was:

This distance between clay layers is calculated using the Bragg equation as shown below (Eq 3):

(3)

Almost similar results were found in the work of El Achaby et al, reported on the change of MMT-Na by 2-(1-hydroxyethyl)-1,3-dihexadecyl-benzimidazolium bromide (Bz), the interlayer distances have increased from 11.5 Å to 30 Å.37

The corrected commentary is after:

This distance between clay layers is calculated using the Bragg equation as shown below (Eq3):

(3)

The foundry BNT shows the characteristic peak at 2 = 8.91, corresponding to the interlayer distance (d001-spacing) of 9.91 Å. For the MMT-Na, the peak of the montmorillonite is found at 2 = 6.27, corresponding to the interlayer distance (d001-spacing) of 14.06 Å. This increase in d001-spacing of MMT-Na+ was previously found by D. E. Kherroub and al.41 It is likely be attributed to the aggressive ion exchange of the calcium cations (Ca2+ = 100 pm) by sodium cations (Na+= 102 pm), which is bigger than calcium cations. Almost similar results were found in the work of El Achaby et al, reported on the change of MMT-Na+ by 2-(1-hydroxyethyl)-1,3-dihexadecyl-benzimidazolium bromide (Bz), the interlayer distances have increased from 14.06 Å to 29 Å.38

1. The composites based on the PUR3 formulation are prepared by using 2–10  
   % of clay. Why do you used only 2 %  of OMMT to prepare PUR4 composite?

Explanation,

We used only 2 %  of OMMT to prepare PUR4 composite because the proprietors of PUR 3 composites are best for 2% of OMMT due to the best distribution of the OMMT. the improvement of the properties of the polyurethane foams or of the materials is only due to the distribution of montmorillonite to the polymer matrix.

1. Page 10, line 210, the combustion time at 3” for sample PUR3.

Yes, I agree, In order to compare the flammability test results of UL 94 HB for PUR 3  
and its composites, it is necessary to add the combustion time at 3 ” for sample PUR3. The combustion time of the PUR 3 at 100mm of length is 98 seconds.

The previous table was:

TABLE II. Flammability test results UL 94 HB.

|  |  |  |
| --- | --- | --- |
| **Samples** | Observation | UL 94 HB Classification |
| **PUR 3** | The sample exceeds the 1" mark before the 30 seconds end. | No |
| **PUR 3 + 2% OMMT** | A length of 100 mm burns for 210 seconds. | Yes |
| **PUR 3 + 3% OMMT** | A length of 100 mm burns for 135 seconds. | Yes |
| **PUR 3 + 5% OMMT** | A length of 100 mm burns 190 seconds. | Yes |
| **PUR 3 + 7 % OMMT** | A length of 100 mm burns for 180 seconds. | Yes |
| **PUR 3 + 10% OMMT** | A length of 100 mm burns for 175 seconds. | Yes |
| **PUR 4** | A length of 100 mm burns for 226 secondes. | Yes |
| **PUR 4 + 2% OMMT** | A length of 100 mm burns for 220 seconds. | Yes |

The time and length values ​​represent the average of three tests.

The corrected table is after:

TABLE II. Flammability test results UL 94 HB.

|  |  |  |
| --- | --- | --- |
| **Samples** | Observation | UL 94 HB Classification |
| **PUR 3** | A length of 100 mm burns for 98 seconds. | No |
| **PUR 3 + 2% OMMT** | A length of 100 mm burns for 210 seconds. | Yes |
| **PUR 3 + 3% OMMT** | A length of 100 mm burns for 135 seconds. | Yes |
| **PUR 3 + 5% OMMT** | A length of 100 mm burns 190 seconds. | Yes |
| **PUR 3 + 7 % OMMT** | A length of 100 mm burns for 180 seconds. | Yes |
| **PUR 3 + 10% OMMT** | A length of 100 mm burns for 175 seconds. | Yes |
| **PUR 4** | A length of 100 mm burns for 226 secondes. | Yes |
| **PUR 4 + 2% OMMT** | A length of 100 mm burns for 220 seconds. | Yes |

The time and length values ​​represent the average of three tests.

1. Page 12, line 242, tensile test

Yes, I agree, the maximum force used by the machine during the tensile test is mentioned in the manuscript and it is not mentioned in the table, and not the strength at break. For this, I added the maximum force during the tensile test in this table. This result attests the stiffness of this sample and they are proportionally in agreement with the strength at break and the stiffness. The stiffness are not determined from stress-strain curves, but he is given by the machine of tensile test.

The previous table was:

TABLE IV. Results of the tensile test.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Formule** | **Density**  **(kg/dm3)** | **Young's modulus**  **(MPa)** | **Stiffness**  **(N/m)** | **Strength at break**  **(N)** |
| **PUR 3** | 0.4000 ± 0.0091 | 226.6 ± 23.1 | 407860 ± 4300 | 187 ± 2 |
| **PUR 3 + 2% OMMT** | 0.1700 ± 0.0031 | 674.1 ± 3.3 | 2224715 ± 5432 | 40 ± 8 |
| **PUR 3 + 3% OMMT** | 0.2070 ± 0.0054 | 122.1 ± 91.1 | 163660 ± 4321 | 51 ± 7 |
| **PUR 3 + 5% OMMT** | 0.2610 ± 0.0092 | 170.4 ± 6.4 | 299833 ± 3329 | 63 ± 3 |
| **PUR 3 + 7% OMMT** | 0.2170 ± 0.0045 | 148.0 ± 5.2 | 620325 ± 985 | 43 ± 4 |
| **PUR 3 + 10% OMMT** | 0.2550 ± 0.0041 | 379.8 ± 3.3 | 275746 ± 2341 | 48 ± 6 |
| **PUR 4** | 0.5340 ± 0.0033 | 458.9 ± 1.2 | 807595 ± 929 | 315 ± 3 |
| **PUR 4 + 2% OMMT** | 0.2080 ± 0.0021 | 345.4 ± 5.1 | 592830 ± 3351 | 122 ± 5 |

The corrected table is after:

TABLE IV. Results of the tensile test.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Formule** | **Density**  **(kg/dm3)** | **Young's modulus**  **(MPa)** | **Stiffness**  **(N/m)** | **Strength at break (N)** | **Maximale**  **Strength (N)** |
| **PUR 3** | 0.4000 ± 0.0091 | 226.6 ± 23.1 | 407860 ± 4300 | 187 ± 2 | 191,1 ± 3 |
| **PUR 3 + 2% OMMT** | 0.1700 ± 0.0031 | 674.1 ± 3.3 | 2224715 ± 5432 | 40 ± 8 | 65 ± 5 |
| **PUR 3 + 3% OMMT** | 0.2070 ± 0.0054 | 122.1 ± 91.1 | 163660 ± 4321 | 51 ± 7 | 65 ± 7 |
| **PUR 3 + 5% OMMT** | 0.2610 ± 0.0092 | 170.4 ± 6.4 | 299833 ± 3329 | 63 ± 3 | 72 ± 4 |
| **PUR 3 + 7% OMMT** | 0.2170 ± 0.0045 | 148.0 ± 5.2 | 620325 ± 985 | 43 ± 4 | 47 ± 3 |
| **PUR 3 + 10% OMMT** | 0.2550 ± 0.0041 | 379.8 ± 3.3 | 275746 ± 2341 | 48 ± 6 | 66 ± 5 |
| **PUR 4** | 0.5340 ± 0.0033 | 458.9 ± 1.2 | 807595 ± 929 | 315 ± 3 | 433 ± 9 |
| **PUR 4 + 2% OMMT** | 0.2080 ± 0.0021 | 345.4 ± 5.1 | 592830 ± 3351 | 122 ± 5 | 100 ± 8 |

1. Page 13, line 273, XRD polyurethane foam peaks

Effectively, some authors like W. Yang et al 4, H. Lian et al 5, H. Liu et al 6 and E.A. Moawed et al8, find this structure, but not done an explanation for the peak at 40° however, it is not significantly appeared, so, ignore it, and we take off these explanations.

The figure below shows that the peak at 20° is not influenced by the rate of montmorillonite add in the polyurethane foam matrix.

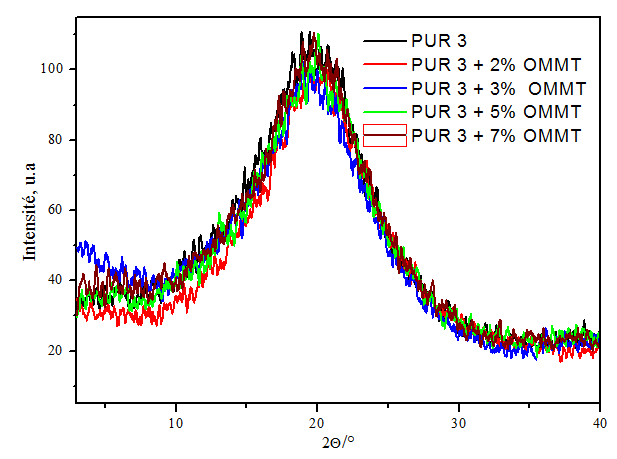


Fig . Juxtaposition of the X-ray diffractograms of the PUR 3 + OMMT nanocomposite foams.

The previous commentary was:

This later show Broad diffuse peaks centered at 2θ=20.35° and low diffuse peaks at 2θ=40° for all samples of PUR 3 charged and uncharged foams. This peak characterized the flexible segments of polyurethane. The polyurethane foams prepared by E.A. Moawed42 have the same shape and peak characteristic as that elaborated in this work.

Yet, it can be seen that the crystallinity of the material, the intensity and width of the characteristic peak was not affected, by the addition of the OMMT. However, we note the disappearance of the second peak characteristic of the polyurethane for PUR 3/2% OMMT, the interlayer distance of the clay is maximized.

We notice also an increase of intensity and a shifting of the peak characterizing the interlayer distance of the clay after polymerization for an angle 2θ less than 3 degrees. Which indicate that the layers of the OMMT are partially exfoliated. This result is in good agreement with those obtained by Zheng et al8 in the work reported on the preparation of polyurethane/montmorillonite nanocomposite with a phosphorus compound. Finally, we have a considerable improvement in the dispersion state of the OMMT in the PUR matrix and we have a better dispersion for 2% OMMT.

The corrected commentary is after:

The polyurethane foams prepared by E.A. Moawed45,W. Yang et al46, H. Lian et al47 and H. Liu et al48 have the same shape and peak characteristic as that elaborated in this work.

The X-ray diffraction for the all samples of PUR 3 charged and uncharged foams show Broad diffuse peaks centered at 2θ=20° for, this peak show the amorphous character of the polyurethane foam. This peak can be correlated with the (110) reflection plane from PUR chains with an inter-chain d-spacing of 0.442 nm.49

We notice a shifting of the peak characterizing the interlayer distance of the clay after polymerization for an angle 2θ less than 3 degrees. Which indicate that the layers of the OMMT are partially exfoliated pour PUR 3+ 3% OMMT. This result is in good agreement with those obtained by Zheng et al8 in the work reported on the preparation of polyurethane/montmorillonite nanocomposite with a phosphorus compound.

12. How the appearance / disappearance of a peak in the diffractogram assigned to the polyurethane matrix affects the interlayer distance of clay in the composite?

Explanation,

the disappearance of the peak characterizing the inter-layer distance of montmorillonite shows a destruction of this crystalline structure, from which a maximum distance between the montmorllonite layer.

When the pics characterized the PUR foam was not affected by the added of OMMT, we can say that the crystalline structure of the foam was not influenced, so, we have a good distribution of the OMMT in the matrix.

13 and 14. Page 15, line 271, Add the used magnification for SEM analysis and increase the size of presenting SEM micrographs.

Yes, I agree,

The size of the SEM micrographs was increased. The magnification for the SEM analysis is an the SEM micrograph and added in the title of the figures.

The previous figures was:

|  |  |
| --- | --- |
|  |  |
| *PUR 3 +2% OMMT* | *PUR 3 + 3% OMMT* |
|  |  |
| *PUR 3 +5% OMMT* | *PUR 3 +7% OMMT* |

Fig 9. SEM micrographs of nanocomposite foams PUR 3 + % OMMT at 200µm.

|  |  |
| --- | --- |
| **C:\Users\Mina\Desktop\memoire nanocomposite\Analyse MEB Yasmine\PUR 3 + 2 % OMMT 100 um.jpg** | **C:\Users\Mina\Desktop\memoire nanocomposite\Analyse MEB Yasmine\PUR 3 + 3 % OMMT 100 um.jpg** |
| *PUR 3 +2% OMMT* | *PUR 3 + 3% OMMT* |
| **C:\Users\Mina\Desktop\memoire nanocomposite\Analyse MEB Yasmine\PUR 3 + 5 % OMMT 100 um.jpg** | **C:\Users\Mina\Desktop\memoire nanocomposite\Analyse MEB Yasmine\PUR 3 + 7 % OMMT 100 um.jpg** |
| *PUR 3 +5% OMMT* | *PUR 3 +7% OMMT* |

Fig 10. SEM micrographs of nanocomposite foams PUR 3 + % OMMT at 100µm.

The corrected figures

|  |  |
| --- | --- |
|  |  |
| *PUR 3 +2% OMMT* | *PUR 3 + 3% OMMT* |
|  |  |
| *PUR 3 +5% OMMT* | *PUR 3 +7% OMMT* |

Fig 9. SEM micrographs of nanocomposite foams PUR 3 + % OMMT at 200µm (300 X).

|  |  |
| --- | --- |
| **C:\Users\Mina\Desktop\memoire nanocomposite\Analyse MEB Yasmine\PUR 3 + 2 % OMMT 100 um.jpg** | **C:\Users\Mina\Desktop\memoire nanocomposite\Analyse MEB Yasmine\PUR 3 + 3 % OMMT 100 um.jpg** |
| *PUR 3 +2% OMMT* | *PUR 3 + 3% OMMT* |
| **C:\Users\Mina\Desktop\memoire nanocomposite\Analyse MEB Yasmine\PUR 3 + 5 % OMMT 100 um.jpg** | **C:\Users\Mina\Desktop\memoire nanocomposite\Analyse MEB Yasmine\PUR 3 + 7 % OMMT 100 um.jpg** |
| *PUR 3 +5% OMMT* | *PUR 3 +7% OMMT* |

Fig 10. SEM micrographs of nanocomposite foams PUR 3 + % OMMT at 100µm (600 X).

15. Page 13, line 252, How you explain the reduction of flame retardant and tensile properties for polyurethane composite synthesized in the presence of catalyst mixture (PUR4/2% OMMT composite)? ON the other hand, the incorporation of 2% OMMT in PUR3 formulation (triethylenediamine catalyst) led to the improvement of properties.

Explanation,

The flame retardant for polyurethane composite synthesized in the presence of a catalyst mixture PUR 4 / 2% OMMT reduced and increased for PUR 3 / 2% OMMT. It is probably due to the organic function operated by the pair mixture of catalyst diamino-1,2 propane and the intercalating agent octadecylamine (ODA) present in the OMMT for PUR 4 / 2% OMMT and not in PUR 3 / 2% OMMT. The reduction of the tensile properties is interfered when we added the diamino-1,2 propane in the composite, this reduction is probably due to perturbation of the hydrogen bond formed between the PUR, the diamino-1,2 propane and OMMT. Moreover, we have an increase in tensile properties PUR 3 charged with 2% by weight of OMMT, probably due to homogeneous hydrogen bond.

The previous discussion was:

It can be observed a proportional relationship between the added clay content and the density from the calculated apparent densities of the prepared materials. This density decreases sharply when we added OMMT and increases according to the rate of OMMT adding. Moreover, we have an increase in stiffness and young’s modulus for only the composite PUR 3 charged with 2% by weight of OMMT, but for composites prepared with the other loading rates of OMMT, the stiffness and the young’s modulus decrease compared to PUR 3 foam. These proprieties decrease for the PUR 4 when we added 2% of the OMMT. On the other hand, the stiffness and the Young’s modulus for PUR 3 and PUR 4 show the effect of the Diamino-1,2 propane. PUR 4 formula has optimum mechanical properties, compared to the other samples.

The corrected discussion is after:

There is a proportional relationship between the added clay content and the density from the calculated apparent densities of the prepared materials. This density decreases sharply when we added OMMT and increases according to the rate of OMMT added. It decreases by 57, 48, 34, 45 and 36% for 2, 3, 5, 7 and 10% of OMMT respectively. This decrease in density is due to the pattern cells formed by the foam, it is noted that the foam with 2% of montmorillonite is formed with open cells that contain other cells.

Moreover, we have an increase in stiffness with 445% and young’s modulus 197% for only the composite PUR 3 charged with 2% by weight of OMMT, despite the opening cells , and just an increase in young’s modulus when we added 10% for OMMT and an increase in stiffness with 52% for the composite charged with 7%. This increase is probably due to closed cells for this composite. The other composites PUR 3 foam display a decrease in the young’s modulus and stiffness proprieties. The mechanical properties is interfered by the presence of clay nanoparticules by the perturbation of the structure of the polyurethane foam leading to reduced mechanical properties and an increase when we have a homogeneous hydrogen bond.

It is important to report that the stiffness and young moduls for PUR 4 is twice as big as PUR 3, it is explained by the increase the presence to the hydrogen bond which increase with the presence of the diamino-1,2 propane. The proprieties of PUR 4 decrease when we added 2% of the OMMT. The density, the stiffness and the Young’s modulus for PUR 4 decrease by 61, 26 and 24% respectively. This decrease is probably due to perturbation of the hydrogen bond formed between the PUR, the diamino-1,2 propane and OMMT. However, PUR 4 formula has optimum mechanical properties, compared to the other samples.

**Answer to reviewer 2**

1. Page 13, line 252, Extend discussion concerning tensile tests relationship between mechanical and morphological properties

Yes, I agree.

The previous discussion was:

It can be observed a proportional relationship between the added clay content and the density from the calculated apparent densities of the prepared materials. This density decreases sharply when we added OMMT and increases according to the rate of OMMT adding. Moreover, we have an increase in stiffness and young’s modulus for only the composite PUR 3 charged with 2% by weight of OMMT, but for composites prepared with the other loading rates of OMMT, the stiffness and the young’s modulus decrease compared to PUR 3 foam. These proprieties decrease for the PUR 4 when we added 2% of the OMMT. On the other hand, the stiffness and the Young’s modulus for PUR 3 and PUR 4 show the effect of the Diamino-1,2 propane. PUR 4 formula has optimum mechanical properties, compared to the other samples.

The corrected discussion is after:

It can be observed a proportional relationship between the added clay content and the density from the calculated apparent densities of the prepared materials. This density decreases sharply when we added OMMT and increases according to the rate of OMMT adding. It decreases by 57, 48, 34, 45 and 36% for 2, 3, 5, 7 and 10% of OMMT respectively. This decrease in density is due to the pattern cells formed by the foam, it is noted that the foam with 2% of montmorillonite is formed with open cells which contain other cells.

Moreover, we have an increase in stiffness with 445% and young’s modulus 197% for only the composite PUR 3 charged with 2% by weight of OMMT, despite the opening cells , and just an increase in young’s modulus when we added 10% for OMMT and an increase in stiffness with 52% for the composite charged with 7%. This increase is probably due to closed cells for this composite. The other composites PUR 3 foam display a decrease in the young’s modulus and stiffness proprieties. The mechanical properties is interfered by the presence of clay nanoparticules by the perturbation of the structure of the polyurethane foam leading to reduced mechanical properties and an increase when we have a homogeneous hydrogen bond.

It is important to report that the stiffness and young moduls for PUR 4 is twice as big as PUR 3, it is explained by the increase the presence to the hydrogen bond which increase with the presence of the diamino-1,2 propane. The proprieties of PUR 4 decrease when we added 2% of the OMMT. The density, the stiffness and the Young’s modulus for PUR 4 decrease by 61, 26 and 24% respectively. This decrease is probably due to perturbation of the hydrogen bond formed between the PUR, the diamino-1,2 propane and OMMT. However, PUR 4 formula has optimum mechanical properties, compared to the other samples.

1. Page 4, line 95, NCO/OH ratios used to determine optimal condition

Yes, I agree

Before working with a formulation, the latter requires an optimization of the operating condition. For this reason rations r = 1.05, 1.10, 1.15, 1.20, 1.25 and 1.30 were formulated and the formulation r = 1.15 was retained for use.

The previous text was:

*Formulation of polyurethane foam*

The final structure of the polyurethane foams (results from polycondensation reaction between polyol and isocyanate) depends on the reagent used and on the ratio -NCO/-OH (Eq 1).

(1)

In our case, equation (1) becomes Eq 2:

(2)

After the calculations carried out, the polyol (CPP), the glycerol, the silicone oil, the catalyst (A-33) are mixed with ultra-turrax (30s), then we added the PMDI and Dichloromethane; the mixture is mixed for 4 to 5 s at a predetermined speed of 6000 rpm and the mixture is injected into the mussel system of the RIM process. After optimization the ratio r (NCO/OH) 1.15 has been retained and denoted PUR 3.

With this same ratio, other plates were prepared but with combined two catalysts, A-33 and Diamino-1,2 propane, the stirring time was 12 s and the formula referred to as PUR 4. Table I summarizes the agitation time, cream time and Rise time for both formulas with which we worked.

The corrected text is after:

*Formulation of polyurethane foam*

The final structure of the polyurethane foams (results from polycondensation reaction between polyol and isocyanate) depends on the reagent used and on the ratio -NCO/-OH (Eq 1).

(1)

In our case, equation (1) becomes Eq 2:

(2)

After the calculations carried out, the polyol (CPP), the glycerol, the silicone oil, the catalyst (A-33) are mixed with ultra-turrax (30s), then we added the PMDI and Dichloromethane; the mixture is mixed for 4 to 5 s at a predetermined speed of 6000 rpm and the mixture is injected into the mussel system of the RIM process.

In order to optimize the formulation several rations are formulated we find r = 1.05, 1.10, 1.15, 1.20, 1.25 and 1.30, the formulation r = 1.15 was retained and denoted PUR 3. With this same ratio, other plates were prepared but with combined two catalysts, A-33 and Diamino-1,2 propane, the stirring time was 12 s and the formula referred to as PUR 4. Table I summarizes the agitation time, cream time and Rise time for both formulas.

1. Page 2, line 58, Purity of PMDI

Yes, I agree, we must added the purity of the PMDI in the material parity. Since, the PMDI is characterized with %NCO which is 30%, however, this reagent was preconditioned under vacuum- oven on 70°C over night and thus to eliminate humidity.

The previous materials was:

### Polyether polyols grafted with 10% of styrene acrylonitrile (SAN) molecules, called copolymer polyol (CPP) or polymer polyether polyol (POPE) were supplied by Confortchem. Polymeric methane diphenyl diisocyanate (PMDI) with 30% of % NCO, was supplied by the company BASF. Triethylenediamine (A-33) used as a catalyst was purchased from Struktol. Glycerol (C3H8O3) from Panreac, Silicone L-580 from Niax, Dichloromethane (CH2Cl2,99.8%) was supplied by AcroSeal. Diamino-1,2-propane (C3H10N2, >98%), sodium chloride (NaCl, 99%), [Ammonium acetate (NH4 OAc, C2H7NO2, ≥98%](https://www.sigmaaldrich.com/catalog/product/sigma/a1542?lang=en&region=US)) and ‎Chlorure de potassium (KCl, 99%) was purchased from [Sigma-Aldrich](http://www.sigmaaldrich.com/catalog/product/aldrich/773204). Hydrochloric acid (HCl, 35-37%) was purchased from Biochem. Hydrogen Dioxide (H2O2, 10V) from Saidal and the intercalating agent Octadecylamine (ODA, 90%) were obtained from Fluka. Foundry bentonite (BNT), unearthed from Hammam-Boughrara layer of Maghnia, was kindly supplied by bental.

The corrected text is after:

### Polyether polyols grafted with 10% of styrene acrylonitrile (SAN) molecules, called copolymer polyol (CPP) or polymer polyether polyol (POPE) were supplied by Confortchem. Polymeric methane diphenyl diisocyanate (PMDI) was supplied by the company BASF. Triethylenediamine (A-33) used as a catalyst was purchased from Struktol. Glycerol (C3H8O3) from Panreac, Silicone L-580 from Niax, Dichloromethane (CH2Cl2,99.8%) was supplied by AcroSeal. Diamino-1,2-propane (C3H10N2, >98%), sodium chloride (NaCl, 99%), [Ammonium acetate (NH4 OAc, C2H7NO2, ≥98%](https://www.sigmaaldrich.com/catalog/product/sigma/a1542?lang=en&region=US)) and ‎Chlorure de potassium (KCl, 99%) was purchased from [Sigma-Aldrich](http://www.sigmaaldrich.com/catalog/product/aldrich/773204). Hydrochloric acid (HCl, 35-37%) was purchased from Biochem. Hydrogen Dioxide (H2O2, 10V) from Saidal and the intercalating agent Octadecylamine (ODA, 90%) were obtained from Fluka. Foundry bentonite (BNT), unearthed from Hammam-Boughrara layer of Maghnia, was kindly supplied by bental.

1. Page 2, line 58, Alkylammonium ions are used for modification of MMT

yes, I agree , we should precise the alkylammonium ions used for the modification of the MMT and this alkylammonium is sited in the material part, he is the octadecylamine (ODA, 90%) from Fluka.

1. Page 1, line 15, change IRTF by FTIR in abstract.

The previous text was:

*Abstract:* In this work, we propose a novel method of elaboration nanostructured foams polyurethane/Organo-modified Montmorillonite (PUR/OMMT) elaborated by in situ polymerization using a twin-screw extruder in contrarotative mode combined with RIM process (reaction injection moulding (RIM) process) with an appropriate montage. The blended polyols (CPP) were included between the OMMT layers via the twin-screw extruder. The formulation of the PUR and the inter-foliar distance in the montmorillonite (MMT) both have been optimized. The effect of some parameters such as MMT content and catalyst were also undertaken. The synthesized materials (OMMT, PUR and PUR/ OMMT) were characterized by different methods; Fourier transform infrared spectroscopy IRFT spectroscopy, X-ray diffraction (XRD) and Scanning electron microscope (SEM) for only PUR/OMMT. The evaluation tests like flammability according to UL 94 and the tensile test were carried out. In view of the obtained results, the PUR 4 foam admits mechanical and flame-retardant properties better than the PUR 3 foam. However, the PUR 4 + 2% OMMT formula exhibits the most delayed flame diffusion and pronounced stiffness.

The corrected text is after:

*Abstract:* In this work, we propose a new method of elaboration nanostructured foams polyurethane/Organo-modified Montmorillonite (PUR/OMMT) elaborated by in situ polymerization using a twin-screw extruder in contrarotative mode combined with RIM process (reaction injection moulding (RIM) process) with an appropriate montage. The blended polyols (CPP) were included between the OMMT layers via the twin-screw extruder. The formulation of the PUR and the inter-foliar distance in the montmorillonite (MMT) both have been optimized. The effect of some parameters such as MMT content and catalyst were also undertaken. The synthesized materials (OMMT, PUR and PUR/ OMMT) were characterized by different methods; Fourier transform infrared spectroscopy FTIR spectroscopy, X-ray diffraction (XRD) and Scanning electron microscope (SEM) for only PUR/OMMT. The evaluation tests like flammability according to UL 94 and the tensile test were carried out. In view of the obtained results, the PUR 4 foam admits mechanical and flame-retardant properties better than the PUR 3 foam. However, the PUR 4 + 2% OMMT formula exhibits the most delayed flame diffusion and pronounced stiffness.

**Answer to reviewer C:**

1. English should be significantly improved throughout the text.

Yes, I agree: in the revised manuscript, we tried to improve the English language.

1. Page 2, line 46 : small letter: polymeric and diamino

The previous text was:

But, no work used the combination of grafted polyol (CPP), Polymeric diphenylmethane diisocyanate (PMDI) and/or Diamino-1,2 propane as a catalyst.

The corrected text is after:

But, no work used the combination of grafted polyol (CPP), polymeric diphenylmethane diisocyanate (PMDI) and/or diamino-1,2 propane as a catalyst.

1. Page 2, line 49 : enhanced

The previous text was:

The main goal of the present study consists in the preparation of nanostructured foam polyurethane/OMMT with enhance mechanical and flame-retardant proprieties.

The corrected text is after:

The main goal of the present study consists in the preparation of nanostructured foam polyurethane/OMMT with enhanced mechanical and flame-retardant proprieties.

1. Page 2, line 56 : were investigated instead of were performed

The previous text was:

The spectral, morphological and mechanical proprieties of the synthesized material were performed.

The corrected text is after:

The spectral, morphological and mechanical proprieties of the synthesized material were investigated.

1. Page 3, line 60 were supplied.

The previous text was:

Polyether polyols grafted with 10% of styrene acrylonitrile (SAN) molecules, called copolymer polyol (CPP) or polymer polyether polyol (POPE) supplied by Confortchem.

The corrected text is after:

Polyether polyols grafted with 10% of styrene acrylonitrile (SAN) molecules, called copolymer polyol (CPP) or polymer polyether polyol (POPE) were supplied by Confortchem.

1. Page 3, line 61 was supplied

The previous text was:

Polymeric methane diphenyl diisocyanate (PMDI) supplied by the company BASF.

The corrected text is after:

Polymeric methane diphenyl diisocyanate (PMDI) with 30% of %NCO, was supplied by the company BASF.

1. Page 3, line 62: was purchased

The previous text was:

Triethylenediamine (A-33) used as catalyst purchased from Struktol.

The corrected text is after:

Triethylenediamine (A-33) used as catalyst was purchased from Struktol

1. Page 3, line 64 : was supplied by AeroSeal

The previous text was:

Dichloromethane (CH2Cl2,99.8%) from AcroSeal.

The corrected text is after:

Dichloromethane (CH2Cl2,99.8%) was supplied by AcroSeal.

1. Page 3, line 66 were purchased

The previous text was:

Diamino-1,2-propane (C3H10N2, >98%) and sodium chloride (NaCl, 99%) purchased from [Sigma-Aldrich](http://www.sigmaaldrich.com/catalog/product/aldrich/773204).

The corrected text is after:

Diamino-1,2-propane (C3H10N2, >98%) and sodium chloride (NaCl, 99%) was purchased from [Sigma-Aldrich](http://www.sigmaaldrich.com/catalog/product/aldrich/773204).

1. Page 3, line 66 : was purchased

The previous text was:

Hydrochloric acid (HCl, 35-37%) purchased from Biochem.

The corrected text is after:

Hydrochloric acid (HCl, 35-37%) was purchased from Biochem.

1. Page 3, line 68 : were obtained from Fluka

The previous text was:

Hydrogen Dioxide (H2O2, 10V) from Saidal and the intercalating agent Octadecylamine (ODA, 90%) from Fluka.

The corrected text is after:

Hydrogen Dioxide (H2O2, 10V) from Saidal and the intercalating agent Octadecylamine (ODA, 90%) were obtained from Fluka.

1. Page 3, line 72 : by applying instead of carrying

The previous text was:

The purification of the BNT consists in the elimination of all the impurities like quartz and calcite, then extract the MMT, by carrying various physicochemical treatments.

The corrected text is after:

The purification of the BNT consists in the elimination of all the impurities like quartz and calcite, then extract the MMT, by applying various physicochemical treatments.

1. Page 3, line 73 : sedimented

The previous text was:

In order to extract MMT and remove the quartz particles present in the BNT, we sediment the suspension (BNT/water, 10% Wt) during 70 hours; the aqueous solution was centrifuged in order to recover the MMT.

The corrected text is after:

In order to extract MMT and remove the quartz particles present in the BNT, we sedimented the suspension (BNT/water, 10% Wt) during 70 hours; the aqueous solution was centrifuged in order to recover the MMT.

1. Page 3, line 78 : The sentense should start: In order to obtain uniform MMT surface....

The previous text was:

For the purpose of uniformed the surface of MMT, a cation exchange is necessary.

The corrected text is after:

In order to obtain uniform MMT surface, a cation exchange is necessary.

1. Page 4, line 101 : 30 s

The previous text was:

After the calculations carried out, the polyol (CPP), the glycerol, the silicone oil, the catalyst (A-33) are mixed with ultra-turrax (30s), then we added the PMDI and Dichloromethane; the mixture is mixed for 4 to 5 s at a predetermined speed of 6000 rpm and the mixture is injected into the mussel system of the RIM process.

The corrected text is after:

After the calculations carried out, the polyol (CPP), the glycerol, the silicone oil, the catalyst (A-33) are mixed with ultra-turrax (30 s), then we added the PMDI and dichloromethane; the mixture is mixed for 4 to 5 s at a predetermined speed of 6000 rpm and the mixture is injected into the mussel system of the RIM process.

1. Page 4,line 102 : was stirred instead was mixed

The previous text was:

After the calculations carried out, the polyol (CPP), the glycerol, the silicone oil, the catalyst (A-33) are mixed with ultra-turrax (30 s), then we added the PMDI and dichloromethane; the mixture is mixed for 4 to 5 s at a predetermined speed of 6000 rpm and the mixture is injected into the mussel system of the RIM process.

The corrected text is after:

After the calculations carried out, the polyol (CPP), the glycerol, the silicone oil, the catalyst (A-33) was stirred with ultra-turrax (30 s), then we added the PMDI and dichloromethane; the mixture was stirred for 4 to 5 s at a predetermined speed of 6000 rpm and the mixture is injected into the mussel system of the RIM process.

1. Page 4, line 108 : rise time

The previous text was:

Table I summarizes the agitation time, cream time and Rise time for both formulas with which we worked.

The corrected text is after:

Table I summarizes the agitation time, cream time and rise time for both formulas with which we worked.

1. Page 4, line 108, after formulas should be the end of the sentence.

The previous text was:

Table I summarizes the agitation time, cream time and rise time for both formulas with which we worked.

The corrected text is after:

Table I summarizes the agitation time, cream time and rise time for both formulas.

1. Page 5, line 118,: 10 wt. %

The previous text was:

For the PUR 3 formula, we added 2, 3, 5, 7 and 10wt % and for the PUR 4 formula, we add only 2 wt. % of OMMT.

The corrected text is after:

For the PUR 3 formula, we added 2, 3, 5, 7 and 10 wt. % and for the PUR 4 formula, we add only 2 wt. % of OMMT.

1. Page 6, line 141: appear instead of appears; attributed

The previous text was:

After organophilic modification, new peaks at 3263 and 1466 cm-1 appears in which were attributed to the stretching and bending vibrations of C-N group, respectively 34,35, at 2918 and 2853 cm-1 were associated to the stretching C–H 22,36,37, showing the existence of organic functions.

The corrected text is after:

After organophilic modification, new peaks at 3263 and 1466 cm-1 appear in which were appear is due to the stretching and bending vibrations of C-N group, respectively 35,36, at 2918 and 2853 cm-1 were associated to the stretching C–H 22,37,38, showing the existence of organic functions.

1. page 6, line 146 : is presented

The previous text was:

The X-ray diffraction pattern of the fondery BNT, MMT-Na+ and OMMT presented in Fig. 2.

The corrected text is after:

The X-ray diffraction pattern of the fondery BNT, MMT-Na+ and OMMT is presented in Fig. 2.

1. Page 7, line 151: confirms

The previous text was:

The X-ray diffraction pattern of the fondery BNT, MMT-Na+ and OMMT presented in Fig. 2 confirm the extraction and purification of MMT by the elimination of the peaks specific to quartz and the organophilic modification.

The corrected text is after:

The X-ray diffraction pattern of the fondery BNT, MMT-Na+ and OMMT presented in Fig. 2 confirms the extraction and purification of MMT by the elimination of the peaks specific to quartz and the organophilic modification.

1. Page 7, line 158 : is instead of are

The previous text was:

This distance between clay layers are calculated using the Bragg equation as shown below (Eq 3):

The corrected text is after:

This distance between clay layers is calculated using the Bragg equation as shown below (Eq 3):

1. Page 10, line 210 : dimensions of 127x12.7.12.7

The previous text was:

We used this test for the prepared polyurethane foam samples that have 127 × 12.7 × 12.7 mm as dimensions. Marks are indicated on the sample at 25.4 (1 ") mm and 101.6 mm (3").

The corrected text is after:

We used this test for the prepared polyurethane foam samples that have 127×12.7×12.7 mm as dimensions. Marks are indicated on the sample at 25.4 (1 ") mm and 101.6 mm (3").

1. Page 17 , line 318 : is successfully achieved

The previous text was:

The purification and the organophilic modification of the montmorillonite are successfully prepared, the distance between clay layers have a significant improvement after treatment.

The corrected text is after:

The purification and the organophilic modification of the montmorillonite are successfully achieved, the distance between clay layers have a significant improvement after treatment.

1. Page 17, line 314 : shows

The previous text was:

The results of this study provide further that the PUR foams prepared in this work exhibit interesting mechanical properties and the PUR 4 prepared by diamino-1,2 propane catalyst show the best mechanical properties but there is not classified in the *UL 94* V- flammability.

The corrected text is after:

The results of this study provide further that the PUR foams prepared in this work exhibit interesting mechanical properties and the PUR 4 prepared by diamino-1,2 propane catalyst shows the best mechanical properties but there is not classified in the *UL 94* V- flammability.

1. Page 17, line 306: The meaning of more or less ????

I mean say by more or less in the conclusion that we have an increase for PUR 3 + 2% OMMT composite and a decrease for PUR 3 + 3% OMMT, PUR 3 + 5% OMMT and PUR 4 + 2% OMMT for young’s modulus and stiffness proprieties. But we have an increase for PUR 3 + 7% OMMT and a decrease for PUR 3 + 10% OMMT for stiffness proprieties, and an increase for PUR 3 + 10% OMMT and a decrease for PUR 3 + 7 % OMMT for young’s modulus.

1. Page 17, line 306, Improve the conclusions

Yes, I agree,

The previous text was:

The purification and the organophilic modification of the montmorillonite are successfully achieved, the distance between clay layers have a significant improvement after treatment. The results of this study provide further that the PUR foams prepared in this work exhibit interesting mechanical properties and the PUR 4 prepared by diamino-1,2 propane catalyst shows the best mechanical properties but there is not classified in the *UL 94* V- flammability. The mechanical properties have been more or less and the test of flammability shows a decrease in the rate of combustion during the addition of the OMMT. The optimum mechanical property and the retardant flame are achieved for 2% charge rate. The stiffness for the PUR 3 + 2% OMMT increase by 445% and 45 % for PUR 4 + 2% OMMT to supply PUR 3. The retardant flame increase to 210 seconds for PUR 3 + 2% OMMT and to 220 seconds for PUR 4 + 2% OMMT when PUR 3 was not classified by UL 94 HB flammability. On the other hand, the variation in the size of the cells is in agreement with the variation in the density of the elaborated foams.

The corrected conclusion is after:

The purification and the organophilic modification of the montmorillonite are successfully achieved. The distance between clay layers have an important increase after treatment. The PUR 4 prepared using diamino-1,2 propane catalyst shows best mechanical properties but it is not classified in the *UL 94* V- flammability. PUR/OMMT nanocomposites foam prepared by using a twin-screw extruder in counter-rotating mode assisted by RIM process shows interesting propriety for PUR 3 + 2% OMMT composite. The stiffness for the PUR 3 + 2% OMMT increased by 445% and 45 % for PUR 4 + 2% OMMT to supply PUR 3. The retardant flame increased to 210 seconds for PUR 3 + 2% OMMT and to 220 seconds for PUR 4 + 2% OMMT while PUR 3 was not classified by UL 94 HB flammability.

1. Did authors check thermal stability and degradation of prepared PU foams, since it is very important for their application?

Yes, I agree the thermal stability is very important for their application. These materials are quite stable sill 300° (TGA) reported by many authors like N. Sarier 11, R. H. Patel 12 and J. Xiong 13 , yet this stability is improved by the addition of OMMT.

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