Ionic Liquids as Surfactants for Layered Double Hydroxide Fillers: Effect on the Final Properties of Poly(Butylene Adipate-Co-Terephthalate)

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Table S1: Dependence of gas and water vapor diffusion coefficients in poly(butylene adipate-co-terephthalate) (PBAT) polymer materials containing different amount of pristine and organically treated- layered double hydroxides (LDHs)

| Material       | Diffusion coefficient \(D \times 10^{12}\) (m²/s) | Diffusivity selectivity |
|----------------|-----------------------------------------------|-------------------------|
|                | \(H_2\) | \(O_2\) | \(N_2\) | \(CO_2\) | \(H_2O\) | \(H_2/N_2\) | \(O_2/H_2O\) | \(O_2/N_2\) | \(H_2/CO_2\) | \(CO_2/N_2\) |
| PBAT           | 360    | 34    | 17    | 11.3   | 5.7    | 21.5     | 6.0     | 2.1     | 31.9     | 0.7     |
| PBAT-LDH 5%    | 310    | 34    | 25    | 11.3   | 4.1    | 12.3     | 8.4     | 1.4     | 27.5     | 0.4     |
| PBAT-LDH 10%   | 300    | 27    | 25    | 9.0    | 3.5    | 11.9     | 7.7     | 1.1     | 33.4     | 0.4     |
| PBAT/LDH-349 5%| -      | 26    | 17    | 9.0    | 3.3    | -        | 7.9     | 1.5     | -        | 0.5     |
| PBAT/LDH-104 5%| -      | 24    | 19    | 7.8    | 2.3    | -        | 10.3    | 1.3     | -        | 0.4     |
| PBAT/LDH-349 10%| 320   | 28    | 14    | 10.8   | 2.2    | 0.0      | 12.7    | 0.0     | 0.7      | 0.0     |
| PBAT/LDH-351 10%| 328   | 30    | 16    | 10.0   | 2.6    | 20.8     | 11.7    | 1.9     | 32.7     | 0.6     |
| PBAT/LDH-104 10%| 303   | 28    | 28    | 9.5    | 2.1    | 11.0     | 13.6    | 1.0     | 31.8     | 0.3     |
Table S2: Dependence of gas and water vapor solubility coefficients in PBAT polymer materials containing different amount of pristine and organically treated-LDHs

| Material         | Solubility coefficient $S \times 10^6$ (mol·m$^3$/Pa) | Solubility selectivity |
|------------------|--------------------------------------------------------|------------------------|
|                  | $H_2$ | $O_2$ | $N_2$ | $CO_2$ | $H_2O$ | $H_2/N_2$ | $H_2O/O_2$ | $O_2/N_2$ | $CO_2/H_2$ | $CO_2/N_2$ |
| PBAT             | 4.6   | 11.9  | 6.54  | 372    | 153000 | 0.7       | 12900      | 1.8       | 81.2       | 56.9       |
| PBAT-LDH 5%      | 4.9   | 10.1  | 4.06  | 329    | 162000 | 1.2       | 16100      | 2.5       | 67.0       | 80.9       |
| PBAT-LDH 10%     | 4.9   | 11.9  | 4.06  | 373    | 212000 | 1.2       | 17800      | 2.9       | 76.2       | 91.9       |
| PBAT/LDH-349 5%  | -     | 12.4  | 5.82  | 369    | 169000 | -         | 13700      | 2.1       | -          | 63.5       |
| PBAT/LDH-104 5%  | -     | 13.2  | 4.85  | 407    | 199000 | -         | 15200      | 2.7       | -          | 83.8       |
| PBAT/LDH-349 10% | 5.2   | 13.0  | 8.16  | 365    | 214000 | 0.6       | 16600      | 1.6       | 69.9       | 44.7       |
| PBAT/LDH-351 10% | 4.3   | 11.1  | 5.90  | 338    | 197000 | 0.7       | 17800      | 1.9       | 78.6       | 57.2       |
| PBAT/LDH-104 10% | 4.7   | 12.6  | 3.95  | 367    | 280000 | 1.2       | 22300      | 3.2       | 77.5       | 93.0       |