Simulation of the long-term ageing of polypropylene-made disposable surgical masks and filtering facepiece respirators

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**Supplementary Materials**: Figure S1: ATR-FTIR spectra of layer C2 and C3; Figure S2: optical micrograph of B1 and the dust formed from the extensive rupture of its fibres; Figure S3: DSC curves of A1 before and after 1000 h isothermal treatment; Table S1: evolution of the CIELAB coordinates of PP layers as a function of the time of isothermal treatment at 110℃; Table S2: evolution of the CIELAB coordinates of PP layers as a function of the time of accelerated photoageing at 24℃.

Diagrama

Descripción generada automáticamente

**Figure S1**. ATR-FTIR spectra of layer C2 (**a**) and C3 (**b**).

Imagen que contiene Interfaz de usuario gráfica

Descripción generada automáticamente

**Figure S2**. Optical micrograph of B1 (a) and the dust formed from the extensive rupture of its fibres (b). Scale bar 0.5 mm.

Diagrama, Dibujo de ingeniería

Descripción generada automáticamente

**Figure S3**. DSC curves of A1 before (solid line) and after 1000 h isothermal treatment (dashed line): first scan (**a**) and second scan (**b**).

**Table S1**. Evolution of the CIELAB coordinates of PP layers as a function of the time of isothermal treatment at 110℃.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | A1 | | | | A2 | | | | B1 | | | | C1 | | | | C3 | | | |
| Time (h) | ΔL\* | Δa\* | Δb\* | ΔE | ΔL\* | Δa\* | Δb\* | ΔE | ΔL\* | Δa\* | Δb\* | ΔE | ΔL\* | Δa\* | Δb\* | ΔE | ΔL\* | Δa\* | Δb\* | ΔE |
| 20 | 0.06 | 0.74 | 0.86 | 1.14 | -0.63 | 0.25 | 0.25 | 0.72 | -0.41 | 0.24 | -0.24 | 0.53 | -0.31 | 0.23 | 0.48 | 0.62 | -0.30 | 0.22 | 0.21 | 0.43 |
| 100 | -0.24 | -0.45 | -0.56 | 0.76 | -0.04 | 0.05 | 0.95 | 0.95 | 0.41 | 0.05 | 0.75 | 0.86 | -0.52 | 0.10 | 0.66 | 0.85 | -0.07 | -0.14 | 2.30 | 2.31 |
| 150 | -0.01 | 0.46 | -0.89 | 1.00 | -0.06 | -0.03 | 1.39 | 1.39 | -0.32 | 0.03 | 0.29 | 0.43 | -0.12 | 0.11 | 0.29 | 0.33 | -0.29 | -0.29 | 2.46 | 2.49 |
| 200 | 0.97 | 1.84 | 1.80 | 2.75 | -0.40 | -0.11 | 0.91 | 1.00 | -0.11 | -0.03 | 0.12 | 0.17 | -0.20 | 0.05 | 0.33 | 0.39 | -0.66 | -0.57 | 2.43 | 2.58 |
| 250 | -3.21 | -5.02 | -0.24 | 5.96 | -0.39 | -0.11 | 1.58 | 1.63 | -0.45 | 0.02 | -0.07 | 0.46 | -0.02 | 0.05 | 0.39 | 0.39 | -0.90 | -0.38 | 2.40 | 2.59 |
| 325 | -3.94 | -6.07 | 2.21 | 7.57 | -0.31 | -0.36 | 1.63 | 1.70 | -0.46 | -0.09 | 0.22 | 0.52 | -0.22 | -0.05 | 0.34 | 0.41 | -0.86 | -0.34 | 2.38 | 2.55 |
| 500 | -4.75 | -8.08 | 4.35 | 10.33 | -0.57 | -0.37 | 1.80 | 1.92 | -0.48 | -0.14 | 0.10 | 0.51 | -0.60 | -0.81 | 3.06 | 3.22 | -0.86 | -0.32 | 2.58 | 2.74 |
| 750 | -4.94 | -8.58 | 6.39 | 11.78 | -0.64 | -0.40 | 1.25 | 1.46 | -0.27 | 0.07 | -0.17 | 0.33 | -1.58 | -3.24 | 14.10 | 14.55 | -0.82 | -0.41 | 2.50 | 2.66 |
| 875 | -7.66 | -13.93 | 7.49 | 17.57 | -0.89 | -0.27 | 1.20 | 1.52 | -0.20 | -0.05 | 0.66 | 0.69 | -1.91 | -3.04 | 14.23 | 14.68 | -0.71 | -0.39 | 3.02 | 3.13 |
| 1000 | -13.38 | -19.31 | 9.11 | 25.20 | -0.36 | -0.41 | 2.40 | 2.46 | -0.40 | -0.24 | 0.76 | 0.89 | -1.51 | -3.37 | 15.50 | 15.93 | -0.81 | -0.56 | 3.54 | 3.67 |

**Table S2**. Evolution of the CIELAB coordinates of PP layers as a function of the time as a function of the time of accelerated photoageing at 24℃.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | A1 | | | | A2 | | | | B1 | | | | C1 | | | | C3 | | | |
| Time (h) | ΔL\* | Δa\* | Δb\* | ΔE | ΔL\* | Δa\* | Δb\* | ΔE | ΔL\* | Δa\* | Δb\* | ΔE | ΔL\* | Δa\* | Δb\* | ΔE | ΔL\* | Δa\* | Δb\* | ΔE |
| 100 | -0.60 | -0.19 | -0.34 | 0.72 | -0.15 | -0.07 | 0.31 | 0.35 | -0.09 | -0.11 | 0.27 | 0.31 | 0.20 | -0.04 | 0.33 | 0.39 | -0.36 | -0.09 | -0.01 | 0.37 |
| 250 | -0.90 | -0.12 | -0.21 | 0.93 | -0.08 | -0.12 | 1.07 | 1.08 | -0.33 | -0.06 | -0.05 | 0.34 | -0.16 | 0.04 | 0.13 | 0.21 | -0.34 | -0.20 | 1.15 | 1.22 |
| 500 | -3.52 | 0.97 | 0.23 | 3.66 | - 1 | - 1 | - 1 | - 1 | -0.14 | -1.48 | 0.10 | 1.49 | -2.01 | 0.03 | 0.01 | 2.01 | -0.89 | -0.06 | 0.06 | 0.89 |
| 750 | -10.36 | 2.44 | 2.03 | 10.84 | - 1 | - 1 | - 1 | - 1 | 1.21 | -1.55 | 0.19 | 1.98 | -3.87 | 0.07 | 0.37 | 3.89 | -2.40 | -0.13 | -0.04 | 2.40 |
| 1000 | -17.53 | 0.13 | -1.41 | 17.59 | - 1 | - 1 | - 1 | - 1 | -7.18 | -1.56 | -0.50 | 7.36 | -5.44 | -0.11 | -0.51 | 5.46 | -1.93 | -0.02 | -1.10 | 2.22 |

1 no measurements were possible due to extensive embrittlement and pulverization of the sample.