**Supplementary Material**

**Achieving Antimicrobial Activity Through Poly(N-methylvinylimidazolium) iodide Brushes on Binary-grafted Polypropylene Suture Threads**

**F. López-Saucedo,1,[[1]](#footnote-1)\* G. G. Flores-Rojas,1 C. Alvarez-Lorenzo,2 A. Concheiro,2 O. González-Antonio,3 E. Bucio1,\***

1Department of Radiation Chemistry and Radiochemistry, Instituto de Ciencias Nucleares, Universidad Nacional Autónoma de México, Circuito Exterior, Ciudad Universitaria, CDMX 04510, México

2Department of Pharmacology, Pharmacy, and Pharmaceutical Technology, R+DPharma Group (GI-1645), Facultad de Farmacia, Universidade de Santiago de Compostela, Santiago de Compostela 15782, España

3Department of Organic Chemistry, Facultad de Química, Universidad Nacional Autónoma de México, Ciudad Universitaria, CDMX 04510, México

**Table S1**.Reaction conditions of grafting HEMA or NIPAAm onto pristine PP by pre-irradiation oxidative.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Product** | **Ca** **(mol L-1)** | **Db** **(kGy)** | **Tc** **(°C)** | **td** **(h)** |
| PP-*g*-HEMA (10%) | 1 | 25 | 60 | 3 |
| PP-*g*-HEMA (59%) | 1 | 25 | 65 | 3 |
| PP-*g*-HEMA (104%) | 1 | 25 | 70 | 3 |
| PP-*g*-HEMA (123%) | 1 | 25 | 75 | 3 |
| PP-*g*-HEMA (160%) | 1 | 25 | 80 | 3 |
| PP-*g*-HEMA (19%) | 1 | 15 | 65 | 2 |
| PP-*g*-HEMA (36%) | 1 | 15 | 65 | 3 |
| PP-*g*-HEMA (55%) | 1 | 10 | 70 | 4 |
| PP-*g*-HEMA (51%) | 1 | 20 | 65 | 4.5 |
| PP-*g*-NIPAAm (6%) | 1.5 | 25 | 60 | 24 |
| PP-*g*-NIPAAm (31%) | 1.5 | 25 | 65 | 24 |
| PP-*g*-NIPAAm (34%) | 1.5 | 25 | 70 | 24 |
| PP-*g*-NIPAAm (43%) | 1.5 | 25 | 75 | 24 |
| PP-*g*-NIPAAm (76%) | 1.5 | 25 | 80 | 24 |
| PP-*g*-NIPAAm (20%) | 1.5 | 15 | 80 | 16 |
| PP-*g*-NIPAAm (53%) | 1.5 | 20 | 80 | 7 |
| PP-*g*-NIPAAm (86%) | 1.5 | 40 | 80 | 8 |

aConcentration (mol L-1), bDose (KGy), cTemperature (°C), dtime (h), dose rate 8.6 kGy h-1, in toluene as solvent.

**Table S2**.Reaction conditions of binary grafting by simultaneous irradiation.

|  |  |  |
| --- | --- | --- |
| **Product** | **Ca** **(vol%)** | **Db** **(kGy)** |
| (PP-*g*-HEMA)-*g*-NVIm (10/15%) | 50 | 30 |
| (PP-*g*-HEMA)-*g*-NVIm (59/66%) | 50 | 30 |
| (PP-*g*-HEMA)-*g*-NVIm (104/84%) | 50 | 30 |
| (PP-*g*-HEMA)-*g*-NVIm (123/90%) | 50 | 30 |
| (PP-*g*-HEMA)-*g*-NVIm (160/101%) | 50 | 30 |
| (PP-*g*-HEMA)-*g*-NVIm (19/10%) | 50 | 5 |
| (PP-*g*-HEMA)-*g*-NVIm (19/13%) | 50 | 10 |
| (PP-*g*-HEMA)-*g*-NVIm (19/14%) | 50 | 15 |
| (PP-*g*-HEMA)-*g*-NVIm (19/16%) | 50 | 20 |
| (PP-*g*-HEMA)-*g*-NVIm (19/17%) | 50 | 25 |
| (PP-*g*-HEMA)-*g*-NVIm (51/3%) | 10 | 20 |
| (PP-*g*-HEMA)-*g*-NVIm (51/6%) | 20 | 20 |
| (PP-*g*-HEMA)-*g*-NVIm (51/9%) | 30 | 20 |
| (PP-*g*-HEMA)-*g*-NVIm (51/11%) | 40 | 20 |
| (PP-*g*-HEMA)-*g*-NVIm (51/22%) | 50 | 20 |
| (PP-*g*-HEMA)-*g*-NVIm (36/22%) | 25 | 25 |
| (PP-*g*-NIPAAm)-*g*-NVIm (6/5%) | 50 | 30 |
| (PP-*g*-NIPAAm)-*g*-NVIm (32/25%) | 50 | 30 |
| (PP-*g*-NIPAAm)-*g*-NVIm (34/43%) | 50 | 30 |
| (PP-*g*-NIPAAm)-*g*-NVIm (43/68%) | 50 | 30 |
| (PP-*g*-NIPAAm)-*g*-NVIm (76/74%) | 50 | 30 |
| (PP-*g*-NIPAAm)-*g*-NVIm (34/6%) | 50 | 5 |
| (PP-*g*-NIPAAm)-*g*-NVIm (34/11%) | 50 | 10 |
| (PP-*g*-NIPAAm)-*g*-NVIm (34/18%) | 50 | 15 |
| (PP-*g*-NIPAAm)-*g*-NVIm (34/21%) | 50 | 20 |
| (PP-*g*-NIPAAm)-*g*-NVIm (34/27%) | 50 | 25 |
| (PP-*g*-NIPAAm)-*g*-NVIm (53/29%) | 10 | 20 |
| (PP-*g*-NIPAAm)-*g*-NVIm (53/29%) | 20 | 20 |
| (PP-*g*-NIPAAm)-*g*-NVIm (53/31%) | 30 | 20 |
| (PP-*g*-NIPAAm)-*g*-NVIm (53/37%) | 40 | 20 |
| (PP-*g*-NIPAAm)-*g*-NVIm (53/41%) | 50 | 20 |
| (PP-*g*-NIPAAm)-*g*-NVIm (20/22%) | 25 | 25 |

aConcentration (vol%), bDose (KGy), dose rate 8.6 kGy h-1, at room temperature, using toluene as solvent.

**Table S3**. Diameter and lateral area of some monofilaments before and after single and binary grafting. Mean values and standard deviation (in parentheses).

|  |  |  |
| --- | --- | --- |
| **Monofilament**  | **Diameter media (mm)** | **Lateral area per 1 cm of length (mm2)** |
| Pristine PP | 0.50 (0.01) | 16.1 (0.3) |
| (PP-*g*-NIPAAm)-*g*-NVIm (6/7%) | 0.52 (0.00) | 16.8 (0.0) |
| PP-*g*-HEMA (20%) | 0.52 (0.01) | 16.8 (0.3) |
| PP-*g*-NIPAAm (25%) | 0.51 (0.02) | 16.4 (0.6) |
| (PP-*g*-HEMA)-*g*-NVIm (19/10%) | 0.52 (0.02) | 16.8 (0.6) |
| (PP-*g*-HEMA)-*g*-NVIm (51/11%) | 0.63 (0.02) | 20.2 (0.6) |
| (PP-*g*-NIPAAm)-*g*-NVIm (53/37%) | 0.70 (0.04) | 22.8 (1.2) |

****

**FIG. S1** DSC runs of suture threads at 300 °C.



FIG. S2 TGA runs of suture threads at 800 °C.

1. \* Address all correspondence to F. López-Saucedo at felipelopezsaucedo@gmail.mx and E. Bucio at ebucio@nucleares.unam.mx [↑](#footnote-ref-1)