**Supplementary data**

**Improved self-healing performance of polymeric nanocomposites reinforced with talc nanoparticles (TNPs) and urea-formaldehyde microcapsules (UFMCs)**

Sehrish Habib1, Eman Fayyed1, Abdul Shakoor1\*, Ramazan Kahraman2, Aboubakr Abdullah1

1Center for Advanced Materials (CAM), Qatar University, 2713 Doha, Qatar.

2Department of Chemical Engineering, Qatar University, 2713 Doha, Qatar.

\* Corresponding Authors: [shakoor@qu.edu.qa](mailto:shakoor@qu.edu.qa) Tel: +974–44036867, 974-6612-5107.

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Fig S1: TEM analysis of a) as received TNPs and TNPs loaded with NaNO3

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Fig S2: Open circuit potential, EOCP vs. time, for steel substrate immersed in 3.5 wt % NaCl solution for blank epoxy and modified polymeric nanocomposite coatings 25°C.

Chart

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**Table S1.** The obtained fitted electrochemical values of the EIS data for the blank epoxy and the developed polymeric nanocomposites immersed in 3.5 wt % NaCl for different immersion times at room temperature.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Coatings | Time  (h) | *R*po  (MΩ.cm2) | CPE1  (sn Ω−1cm−2) | n1 | *R*ct  (MΩ.cm2) | CPE2  (sn Ω−1 cm−2) | n2 | *Rs*  (Ohms) | *W*  (sn Ω−1 cm−2) | *IE*  *(%)* | Goodness of fit |
| Scratched Blank epoxy | 24  48  72  96  120 | 0.27  0.11  0.07  0.05  0.01 | 2.67 x 10-9  6.01 x 10-6  1.30 x 10-5  1.72 x 10-4  1.45 x 10-2 | 0.75  0.83  0.82  0.75  0.66 | 0.46  0.20  0.17  0.09  0.01 | 1.94 x 10-10  4.78 x 10-10  8.34 x 10-10  1.07 x 10-9  1.16 x 10-6 | 0.71  0.88  0.79  0.81  0.63 | 775.8  770.3  778.4  756.2  750.8 | -  -  -  -  - | - | 1.03 x 10-4  1.73 x 10-4  3.59 x 10-4  3.33 x 10-4  6.80 x 10-4 |
| Scratched epoxy/1 wt % modified TNPs | 24  48  72  96  120 | 4.54  1.44  11.56  60.65  93.45 | 2.82 x 10-10  3.51 x 10-9  1.53 x 10-9  3.64 x 10-10  3.14 x 10-10 | 0.94  0.65  0.86  0.83  0.84 | 4.61  1.75  12.14  63.62  93.63 | 7.68 x 10-7  7.99 x 10-6  1.43 x 10-8  6.99 x 10-11  1.03 x 10-11 | 0.90  0.62  0.84  0.89  0.80 | 796.5  768.9  760.2  766.6  772.8 | 6.90  10.8  16.5  18.3  32.8 | 88.3  99.5 | 4.85 x 10-4  1.12 x 10-4  7.12 x 10-4  1.09 x 10-6  1.35 x 10-5 |
| Scratched epoxy/3 wt % modified TNPs | 24  48  72  96  120 | 5.61  3.00  58.58  125.8  204.8 | 1.69 x 10-9  1.29 x 10-4  6.63 x 10-5  6.79 x 10-10  1.91 x 10-10 | 0.83  0.60  0.82  0.73  0.82 | 6.15  3.00  58.58  125.80  755.30 | 2.27 x 10-10  1.79 x 10-9  4.83 x 10-10  4.75 x 10-10  4.60 x 10-10 | 0.88  0.68  0.76  0.90  0.86 | 752.7  749.5  732.4  724.2  735.8 | 10.50  13.08  19.50  22.20  45.30 | 96.7  99.9 | 3.70 x 10-4  2.94 x 10-4  1.38 x 10-4  3.56 x 10-4  2.44 x 10-4 |