Biomimetic Catechol based Adhesive Polymers for Dispersion of Polytetrafluoroethylene (PTFE) Nanoparticles in an Aqueous Medium

Manjit Singh Grewal, Hiroshi Yabu*

WPI-Advanced Institute of Materials Research (WPI-AIMR), Tohoku University, 2-1-1, Katahira, Aoba-Ku, Sendai 980-8577, Japan

Supplementary

Figure S1. Representative photograph of adhesive polymer, poly(PDMA-PEEA) 1:10.
**Figure S2:** $^1$H-NMR of adhesive polymer, poly(PMDA-PEEA) with DMA: EEA as (a) 1:2.5 (b) 1:5 (c) 1:7.2 (d) 1:10.

**Figure S3:** FT-IR spectra of EEA, DMA and copolymer poly(PDMA-PEEA).
**Figure S4:** GPC results of adhesive polymer, poly(PMDA-PEEA).

**Table S1:** Time dependence contact-angle measurements of poly(PDMA-PEEA) with different EEA contents on glass substrates.

| Time (in minutes) | Polymer (1:2.5) | Polymer (1:5.0) | Polymer (1:7.2) | Polymer (1:10) |
|-------------------|-----------------|-----------------|-----------------|----------------|
|                   | CA±SD           | CA±SD           | CA±SD           | CA±SD         |
| 0                 | 77.2 ± 3.7      | 70.6 ± 7.3      | 72.7 ± 5.0      | 69.7 ± 5.2    |
| 20                | 75.7 ± 8.3      | 57.8 ± 6.7      | 62.6 ± 4.9      | 57.1 ± 8.5    |
| 40                | 69.4 ± 8.4      | 50.9 ± 17.5     | 58.2 ± 9.8      | 39.8 ± 14.6   |
| 60                | 53 ± 11.3       | 40.7 ± 9.0      | 37.9 ± 11.4     | 24.5 ± 3.0    |
| 80                | 52.5 ± 9.6      | 34.6 ± 5.3      | 32.6 ± 12.0     | 23.7 ± 4.3    |
| 100               | 45.3 ± 11.4     | 28.9 ± 11.8     | 28 ± 10.0       | 18.4 ± 1.9    |
Figure S5 (a). FT-IR spectra of pristine PTFE and poly(PDMA-PEEA) coated PTFE. (b) UV-Vis spectra of poly(PDMA-PEEA) and poly(PDMA-PEEA) coated PTFE in THF.

The FT-IR spectra of pristine PTFE show peaks for the CF$_3$ (1250 cm$^{-1}$) and CF$_2$ (1190 cm$^{-1}$) groups, whereas in poly(PDMA-PEEA) coated PTFE the appearance of C=O (1715 cm$^{-1}$) strongly indicates the coating of PTFE by polymer. In addition, UV-Vis
spectra of poly(PDMA-PEEA) and poly(PDMA-PEEA)@PTFE shows the absorption peaks around 300 nm, which is attributed to the presence of catechol moieties.