Supplemental Information

Direct Modification of Polyolefin Films by Surface-initiated Polymerization of a Phosphobetaine Monomer

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1. XPS analysis of PP-MI sheets

X-ray photoelectron spectroscopy (XPS) was performed at a 45° take-off angle on an XPS-APEX instrument (Physical Electronics Co. Ltd.) with a monochromatic Al–*K*α x-ray source at a power of 150 W and a pressure of 1×10^{-6} Pa.

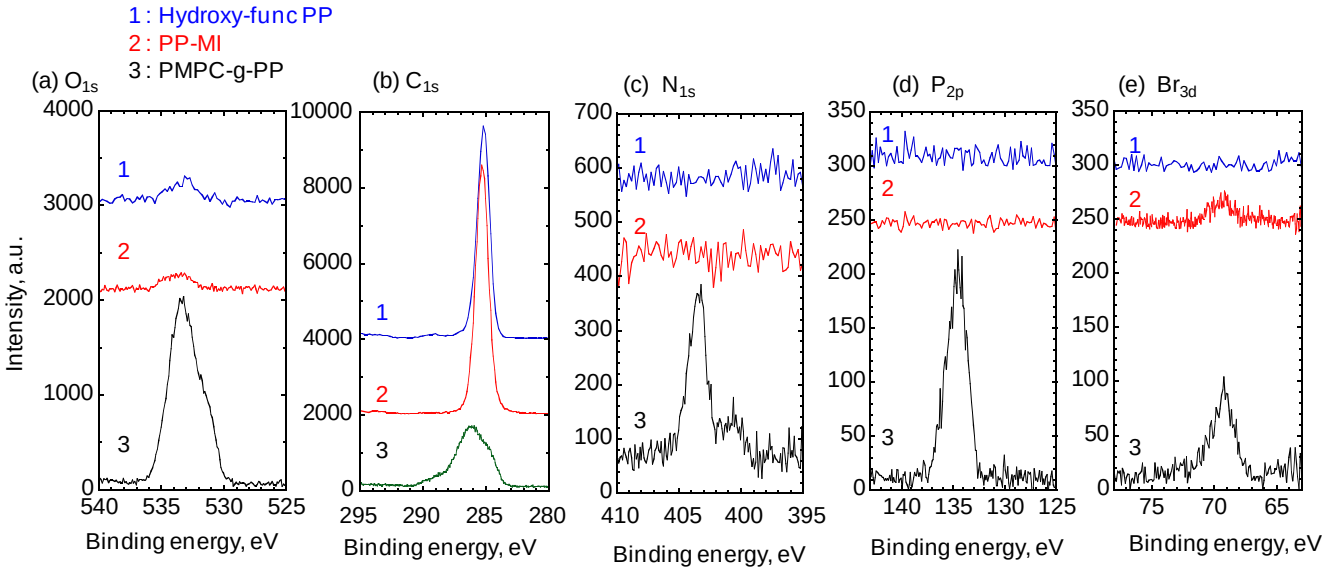

Fig. S1. XPS spectra of narrow scan for (a) oxygen, (b) carbon, (c) nitroge, (d) phosphous , (e) bromine of (1) hydroxyl-functionalized PP (poly(propylene-*co*-undec-10-en-1-ol)), (2) PP-MI and (3) PMPC-*g*-PP sheets.

3. Surface roughness observed by AFM

Atomic force microscopy (AFM) observations were carried out using a Cypher AFM system (Asylum Research, Santa Barbara, CA) using a silicon integrated tip on a commercial 160 μm cantilever (OMCL-AC160TS, Olympus Co., Ltd., Tokyo, Japan) with a spring constant of 26 N/m (typical value) for AFM observation in air. The surface was scanned at a rate of 10 μm s^{-1} in air (relative humidity 30%). Fig. S2 shows the 3D

image of the surface in 30 x 30 μm^2. The root-mean-square (rms) surface roughness of the PE-MI sheet was measured by atomic force microscopy in a 10 × 10 μm^2 area to be approximately 41 × 4.6 nm, whereas the rms surface roughness values for the PP-MI sheet and the glass ball were 17 × 1.9 nm and 2.4 × 0.8 nm, respectively. The PE sheet had a greater degree of roughness than the PP sheet.

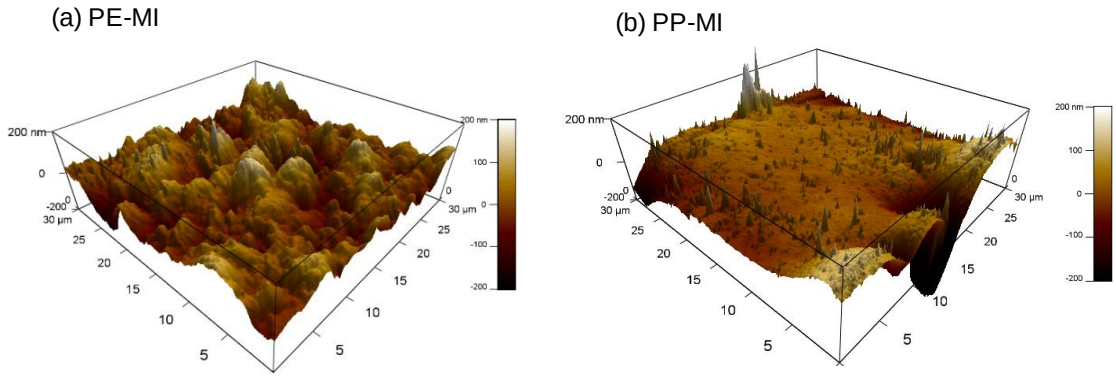

Fig. S2. 3D surface morphology images of PE-MI and PP-MI sheets

2. DSC

Differential scanning calorimetry (DSC) of PP-MI sheet (2.65mg) was performed by Diamond DSC (PerkinElmer) equipped with a CryoFill unit using liquid nitrogen. Heating and cooling rate was 20 K/min from 153 K to 433 K.

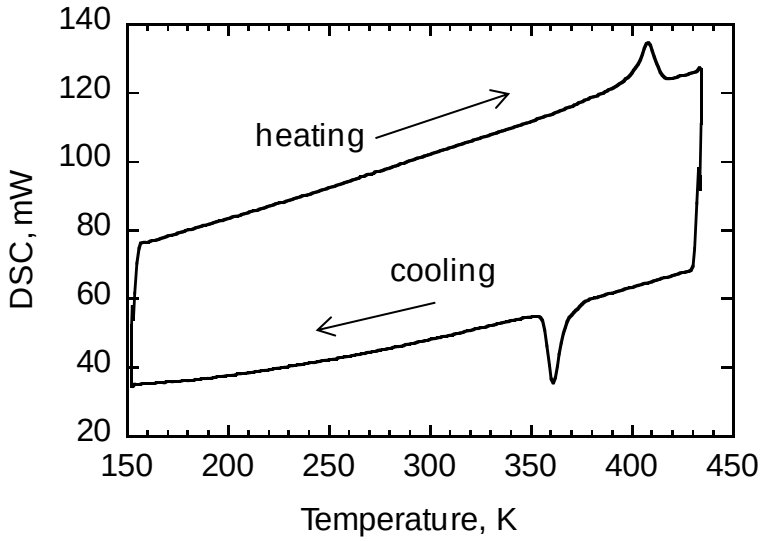

Fig. S3. DSC thermograph of PP-MI sheet at a rate of 20 K/min (2-nd scan profile)

Electronic Supplementary Material (ESI) for Polymer Chemistry