

Supplementary Information

Splitting-induced surface patterns on surface of polystyrene thin films

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Figure S1. XPS spectra of PS films after subjected to UV irradiation of different doses: (a) C 1s, and (b) O 1s

Figure S2. Optical images of the surface gratings formed on the surface of the PS films (nominal $M_w=2300$ g/mol) without UV irradiation; for tension-splitting of a sandwiched specimen, (a) surface gratings on one substrate, and (b) surface gratings on the other substrate; for peeling-splitting of a sandwiched specimen, (c) surface gratings on one substrate, and (d) surface gratings on the other substrate (the arrows show the insertion direction, h is the film thickness)

Figure S3. AFM images of the surface gratings formed on the surface of the PS films ($M_w=2300$ g/mol) without UV irradiation; (a) surface gratings on a PS film of initial thickness of 362 nm by the tension-splitting method, and (b) surface gratings on a PS film of initial thickness of 277 nm by the peeling-splitting method (the arrows show the insertion direction, h is the film thickness)

Figure S4. AFM images of the surface gratings formed on the surface of the irradiated PS films with the irradiation dose of 1.548 J/cm^2 ; (a) surface gratings on a PS film of the thickness of 271 nm by the tension-splitting method, and (b) surface gratings on a PS film of the thickness of 265 nm by the peeling-splitting method (the arrows show the insertion direction, h is the film thickness)

Figure S5. Gel permeation chromatograms of the received PS pellets (M_w : 250,000 g/mol) and the PS made from the fractional precipitation method

Figure S6. AFM images and line scans of the surface gratings formed on the PS films with T_g being: (a) 69.8°C (as-received PS), and (b) 103.2°C (PS made from fractional precipitation) (The arrow represents the insertion direction.)

Figure S7. Optical images of the same spot of the surface gratings formed on the surface of a photoresist film: (a) without the removal of the PS in the surface gratings, and (b) after the removal of the PS in the surface gratings (thickness of PMMA film: 499 nm)

Figure S8. AFM images of the surface gratings of single polymer made from the bilayer-sandwiched structures: (a) PS, and (b) photoresist (h : film thickness)

Figure S9. Variation of the amplitude of the surface gratings with film thickness for the surface gratings made solely of either PS or photoresist and from the bilayer-sandwiched structures (the film thickness is the thickness of pure PS or photoresist film.)

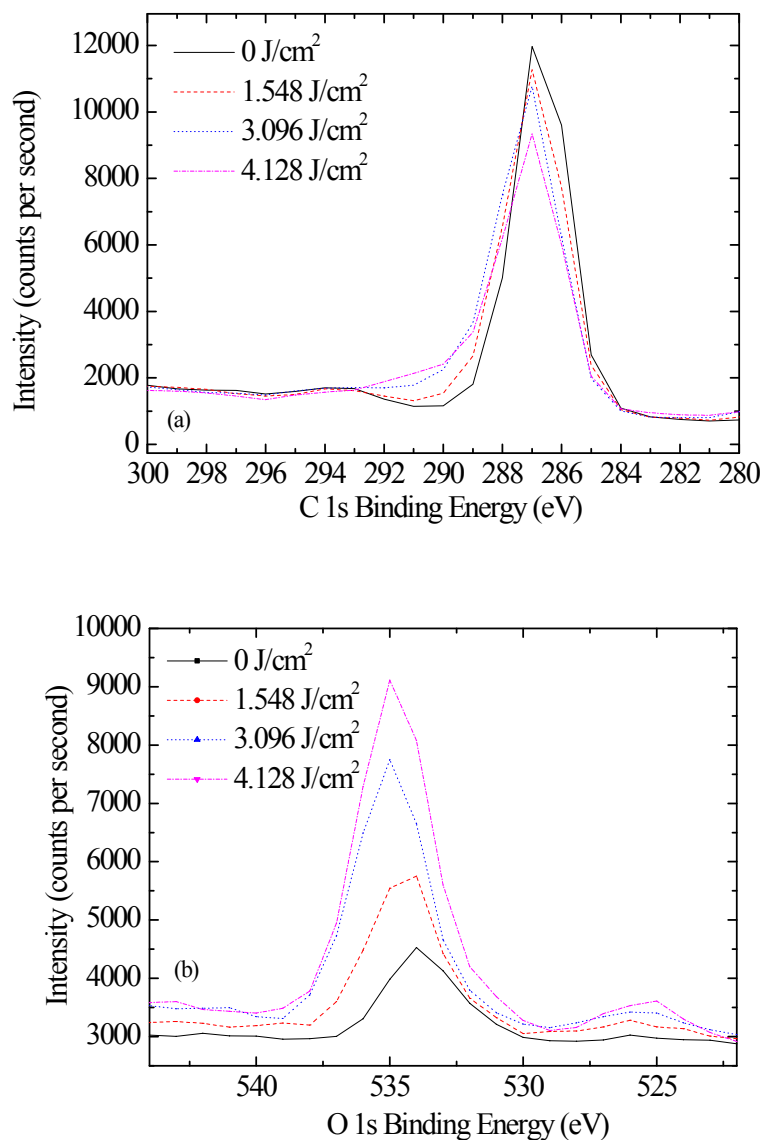


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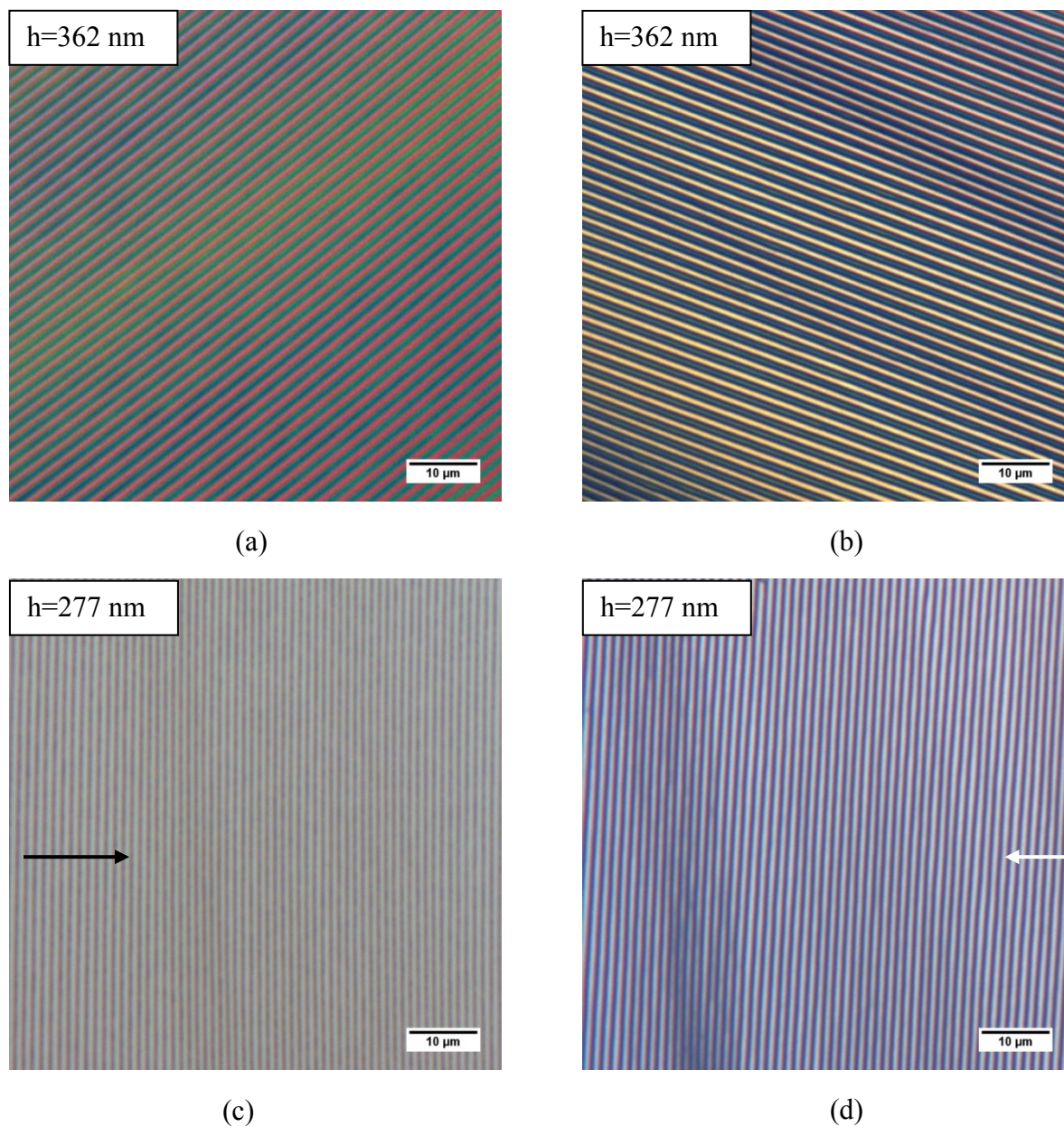


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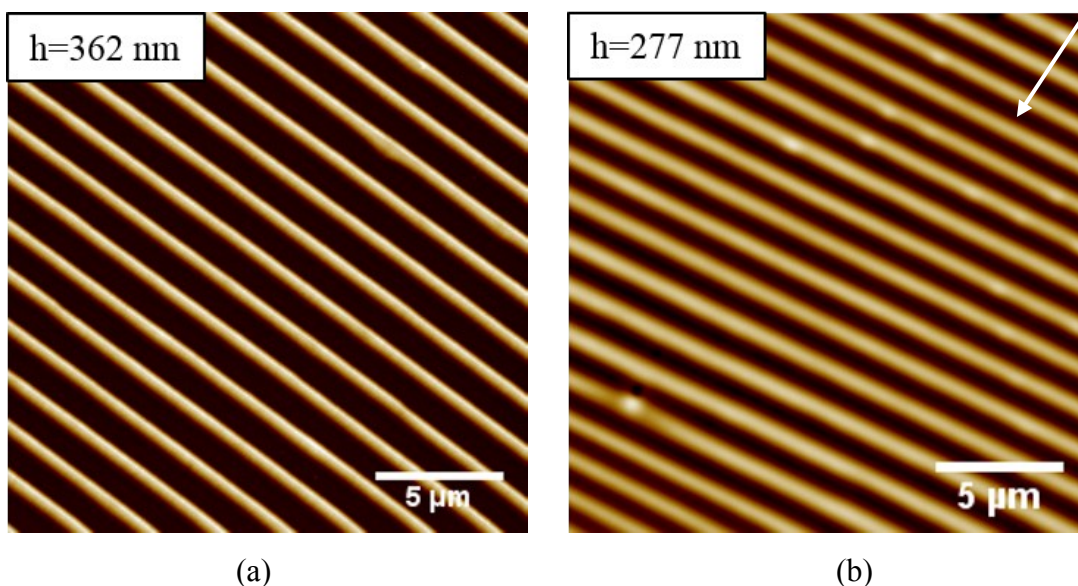


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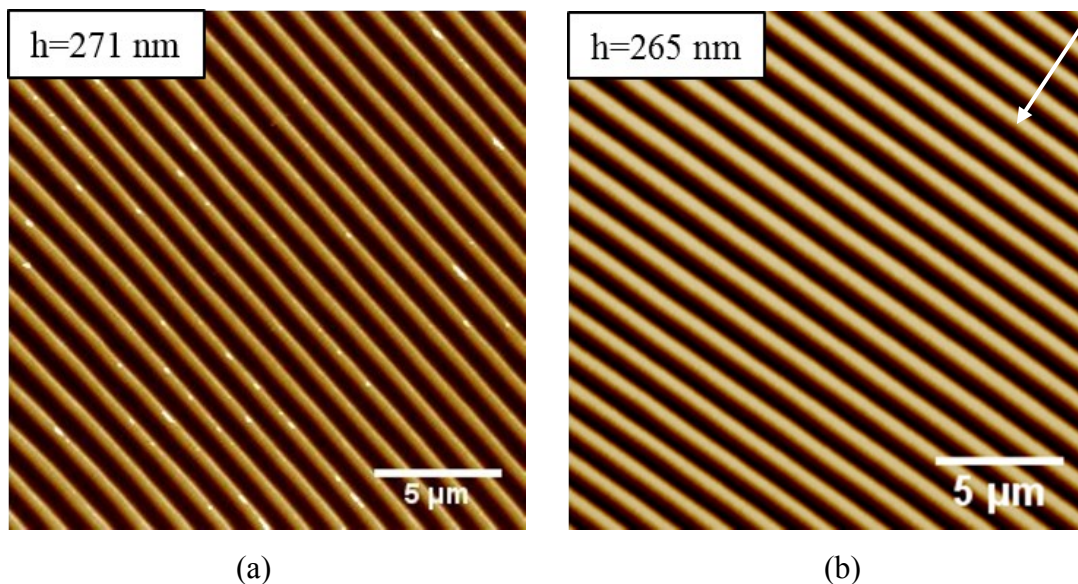


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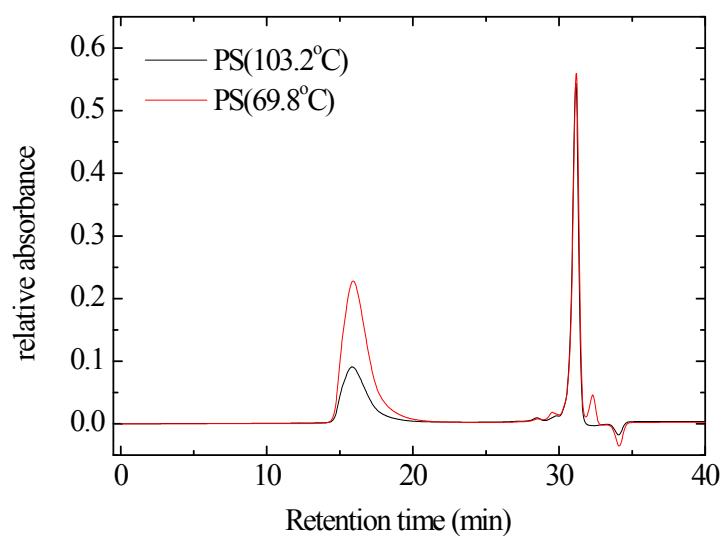
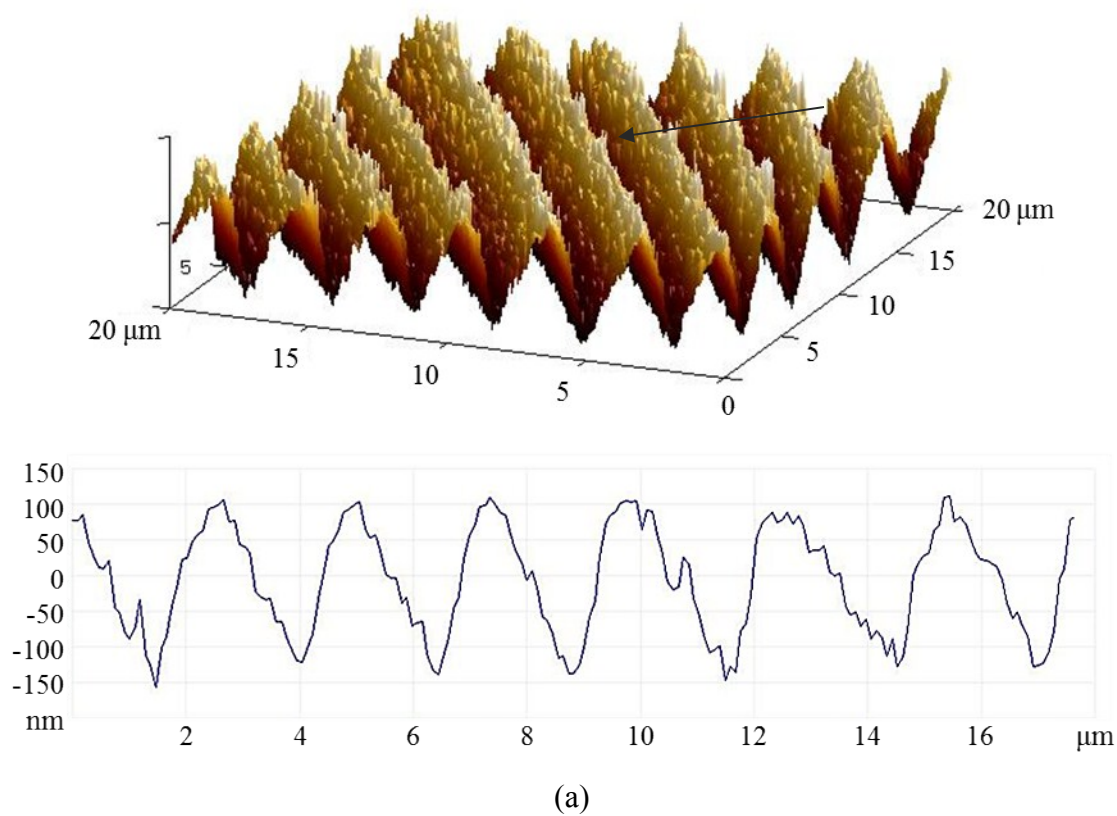


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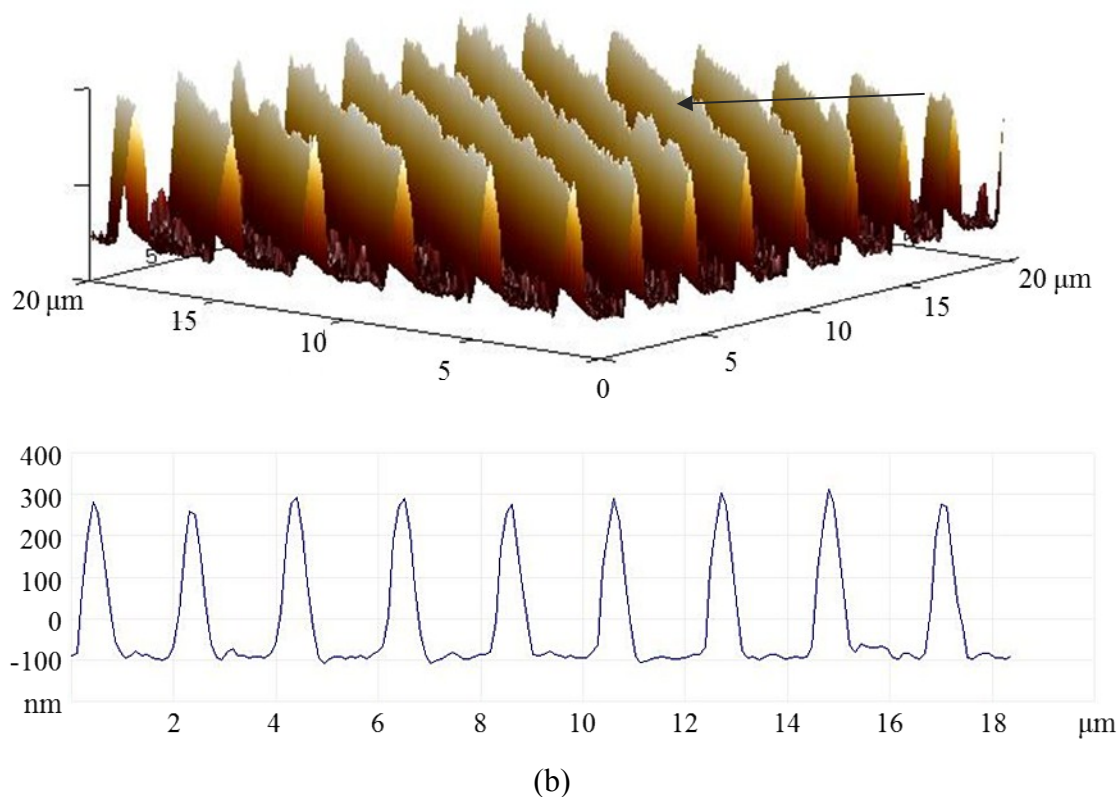


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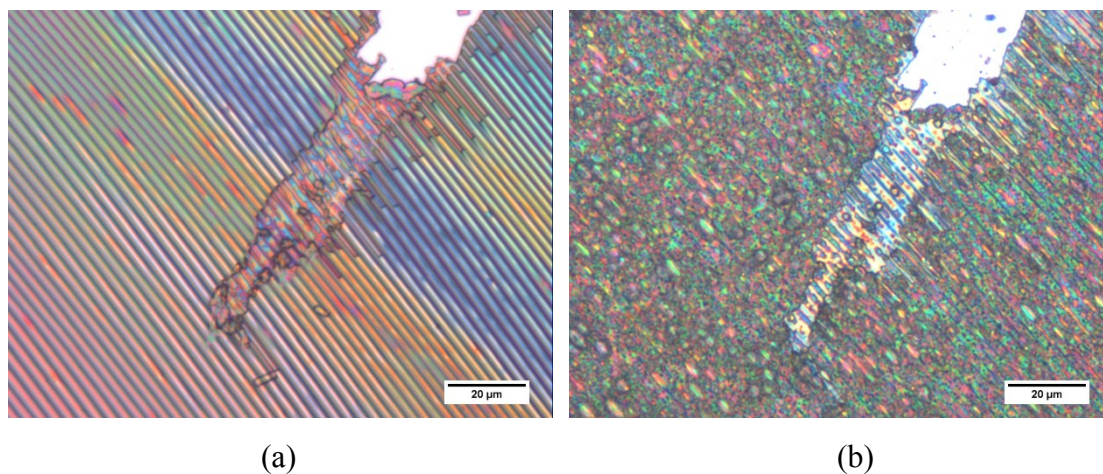


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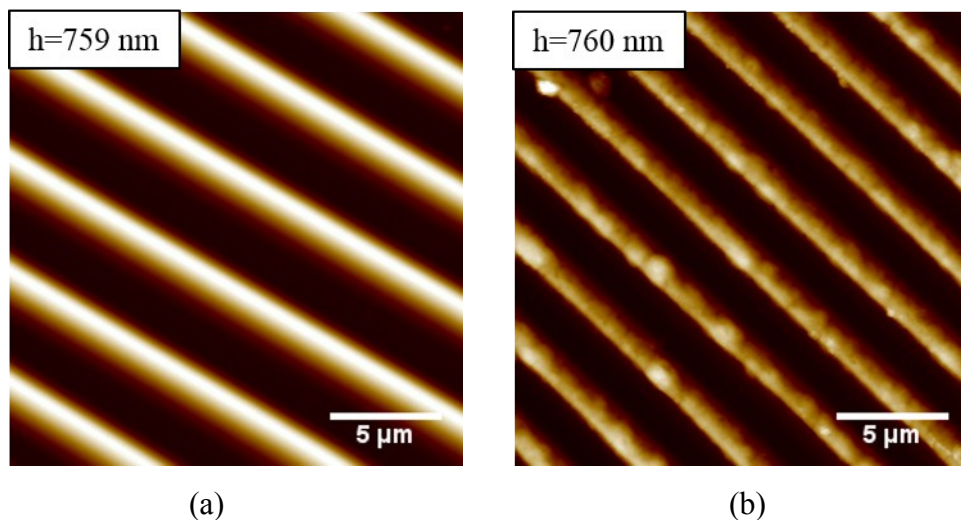


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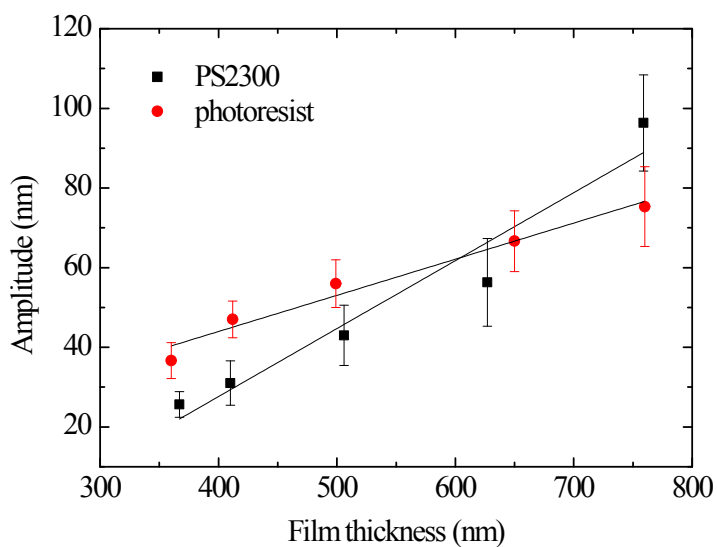


Figure S9. Variation of the amplitude of the surface gratings with film thickness for the surface gratings made solely of either PS or photoresist and from the bilayer-sandwiched structures (the film thickness is the thickness of pure PS or photoresist film.)