Supporting Information for

Intermolecular Hydrogen Bonding between Poly[(R)-3-hydroxybutyrate] (PHB) and Pseudoboehmite (PB) and Its Effect on Crystallization of PHB

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1.

The spin-coating parameters (as described in experimental session in the main article) gives a film with a thickness of around 40 nm, which is determined by X-ray reflectivity (XRR) measurement (Figure S1). For melting, the sample was placed on a preheated hotplate set to 200 °C. The actual temperature of the top surface of the sample is measured to be 180 °C.



Figure S1. X-ray reflectivity data for a typical spin coated film

2.

Fitting parameters and results	Figure 4a	Figure 4b	Figure 4c	Figure 6a	Figure 6b
Fitted Region:	1780 to 1677.79	1780 to 1679.722	1780 to 1679.72	1780 to 1699.97	1780 to 1679.72
Fitted Equations:	3	3	3	3	4
Total Parameters:	8	8	8	8	11
Fitted Parameters:	8	7	7	8	10
Fixed Parameters:	0	1	1	0	1
RMS Noise:	9.960710E-06	8.292160E-07	3.704800E-05	1.600000E-04	4.648390E-07
Correlation R^2:	9.998058E-01	9.998277E-01	9.997257E-01	9.993899E-01	1.00000E+00
Standard Error:	2.601366E-05	4.339383E-05	8.756872E-05	1.077144E-03	1.550000E-11

 Table S1. Fitting parameters and results for IRRAS spectra shown in Figure 4a, 4b, 4c, 6a, and 6b in the in main article. The fitting sensitivity was set as high in the software.

3. Estimation of film thickness as a function of immersing time

After immersion etching treatment in chloroform, the film becomes too thin to be measured by XRR to determine film thickness. An estimation of film thickness can be obtained by comparing carbonyl absorbance of treated samples with that of the as-coated film (40 nm). Based on Beer-Lambert law, transmittance is given by

A=2-log(100T),

Written in absorbance, we have

1-T=1-10^{-A}

where T is transmittance, and A is absorbance. Therefore, film thickness can be calculated

$40*(1-10^{-A})/(1-10^{-A}_{0})$

Where A_0 is the absorbance for as-coated film. Thus-derived film thickness values as a function of immersion time is listed in Table 2.

Immersing time (min)	Absorbance of carbonyl peak	Thickness (nm)		
0	7.29E-02	40		
10	1.51E-02	8.9		
20	9.29E-03	5.5		
40	7.15E-03	4.2		
70	5.13E-03	2.8		

Table S2	. Carbonyl	peak intensity	and estimated	film thickness	for different	immersing times
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4. 1.4 nm a-PHB film vs 40 nm a-PHB film on AO substrate.

The 1.4 nm a-PHB ultrathin layer is prepared by spin coating 0.003 wt % a-PHB in a chloroform solution to AO substrate. The film thickness of this nanolayer is estimated to be 1.4 nm. Comparison of IRRAS for a-PHB on AO 1.4 nm vs 40 nm is shown in Figure S2. Spectra were measured at room temperature.



Figure S2. IRRAS carbonyl regions of a-PHB thin films of 1.4 nm and 40 nm thickness on AO substrate.

5.



Figure S3. Raw IRRAS spectra of the carbonyl region for i-PHB ultrathin film on AO, PB, and gold measured 2 mins after melting.