

Supporting Information For:

Organic–inorganic hybrid coating materials derived from renewable soybean oil and amino silanes

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1. Calculation of the yield of acetoacetylated soybean oil by ^1H NMR

1.1 Calculation of the yield of modified soybean oil (MSO)

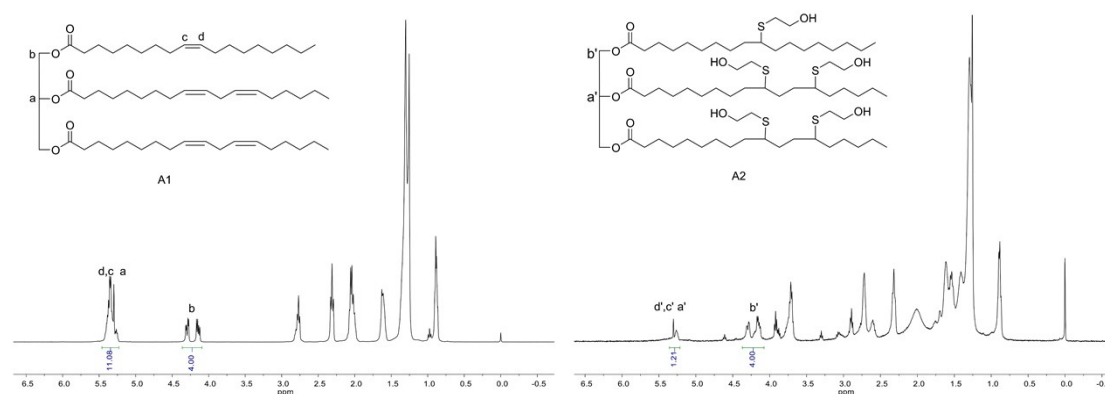


Figure S1 ^1H NMR spectra of (a) soybean oil (SO) and (b) modified soybean oil (MSO)

Figure S1 shows that the peak area of b is 4, and the peak areas of a, c and d are 11.08; thus, the ^1H NMR peak areas correspond to the compound structure. Therefore, we can calculate the yield on the basis of the peak area ratios. The yield of modified soybean oil (A2), $W(\%) = [A(d+c)-A(d'+c')]/A(d+c) = [(11.08-1)-(1.21-1)]/(11.08-1) = 0.98$

1.2 Calculation of the yield of acetoacetylated soybean oil (MA-SO)

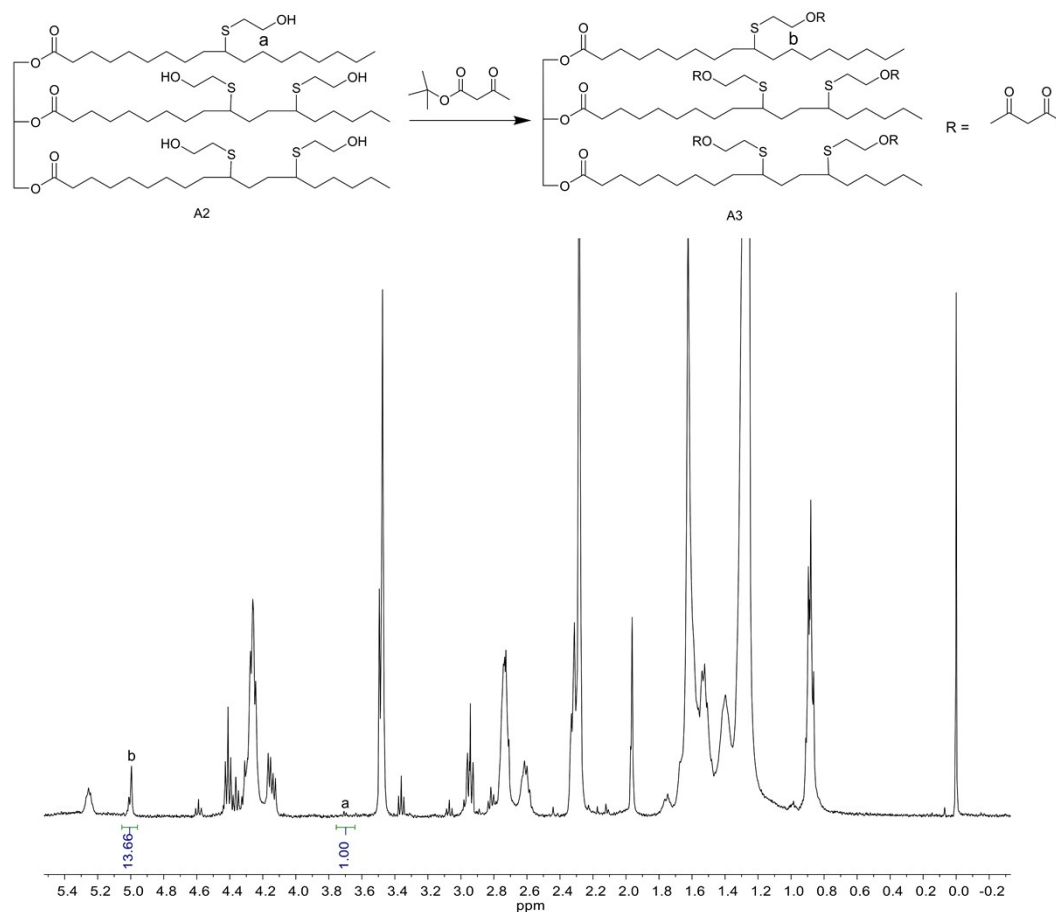


Figure S2 ¹H NMR spectra of (a) the modified soybean oil (MSO) and (b) the acetoacetylated soybean oil (MA-SO)

The calculation method is the same as in 1.1, and the yield of modified soybean oil (A3), $W(\%) = A(b)/[A(b)+A(a)] = (13.66)/(13.66+1) = 0.93$

2. The GPC of acetoacetylated soybean oil

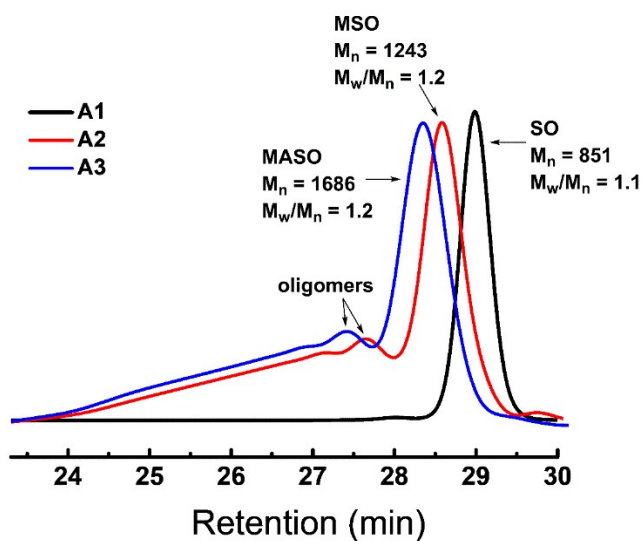


Figure S3 GPC analysis of soybean oil (A1), modified soybean oil (A2) and acetoacetylated soybean oil (A3)

Table S1 Properties of the acetoacetylated soybean oil

Sample	Reaction group ratio	GPC			Yield (%)	Viscosity (Pa.s)
		M_n	M_w	\bar{D}		
A1 ^a	-	851	953	1.1	-	0.05
A2	1:1.2	1243	1528	1.2	98	6.5
A3	1:1	1686	2045	1.2	93	2.3

3. The DSC curves indicating glass transition of the three films (P1, P2, P3)

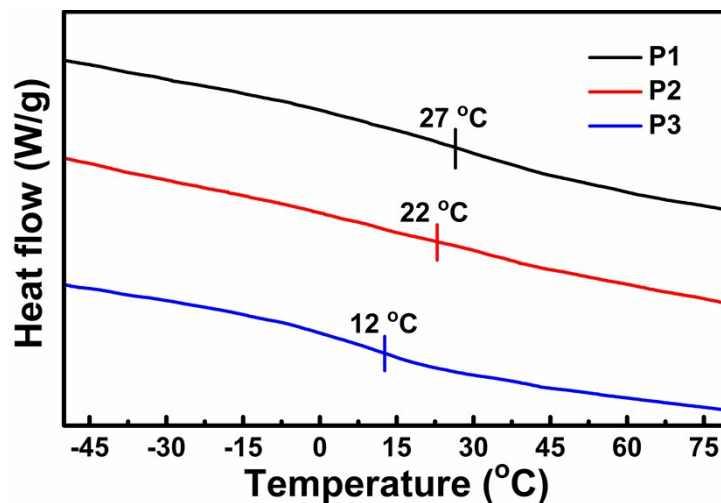


Figure S4 DSC curves indicate the glass transition temperature (T_g) of the three films

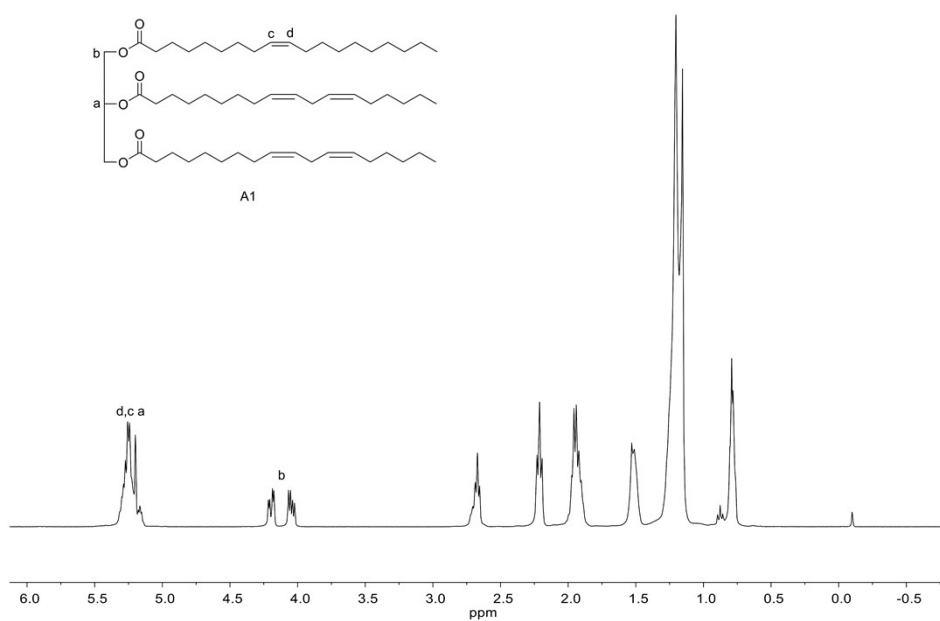


Figure S5 ^1H NMR (400 MHz) spectrum of soybean oil (SO)

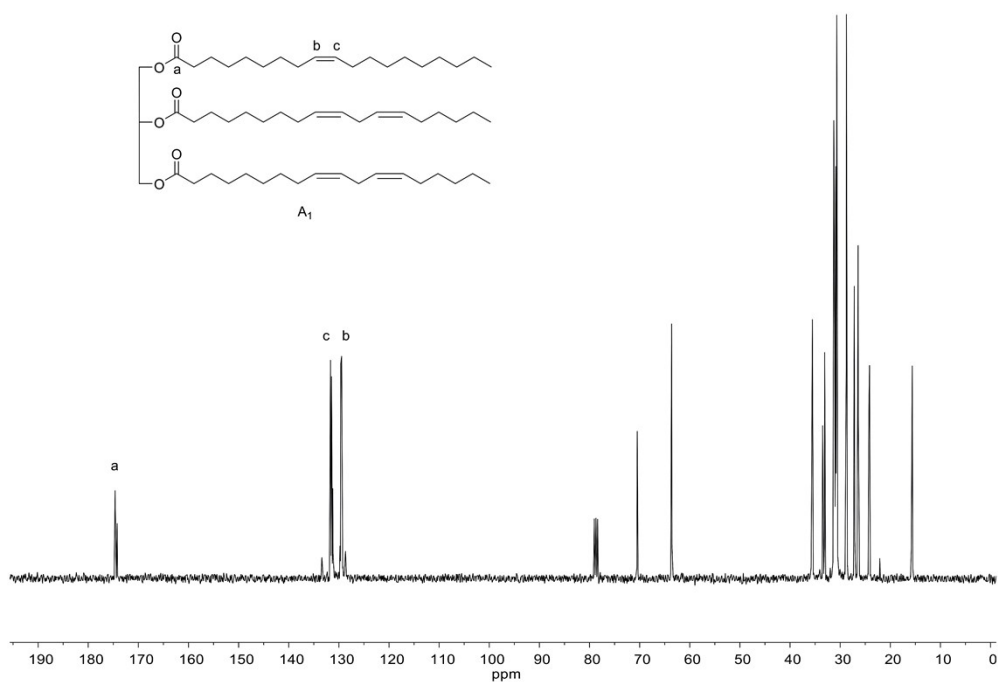


Figure S6 ^{13}C NMR (400 MHz) spectrum of soybean oil (SO)

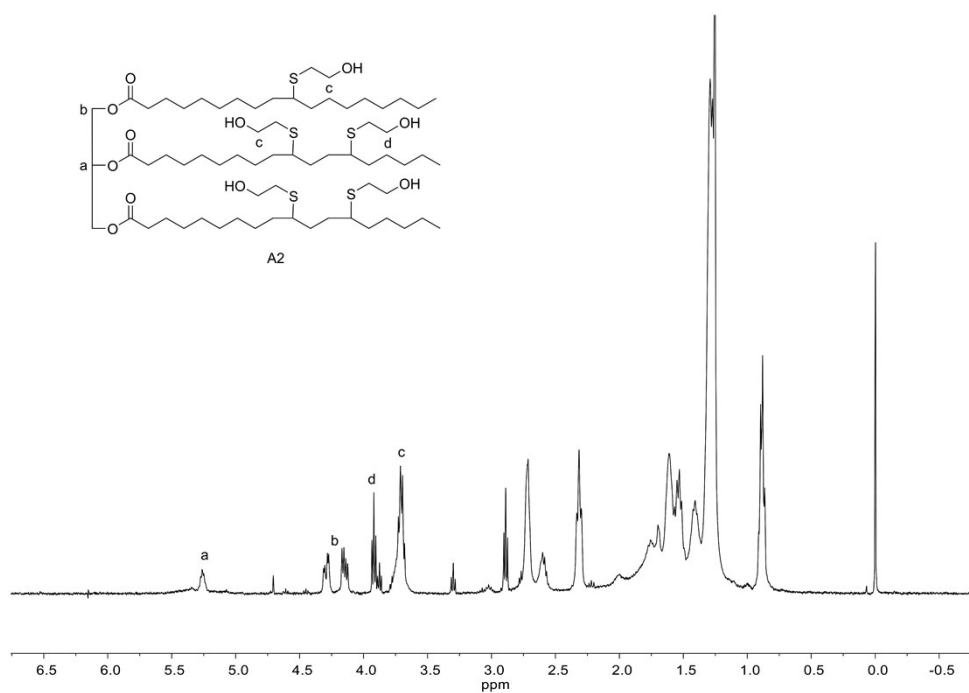


Figure S7 ^1H NMR (400 MHz) spectrum of modified soybean oil (MSO)

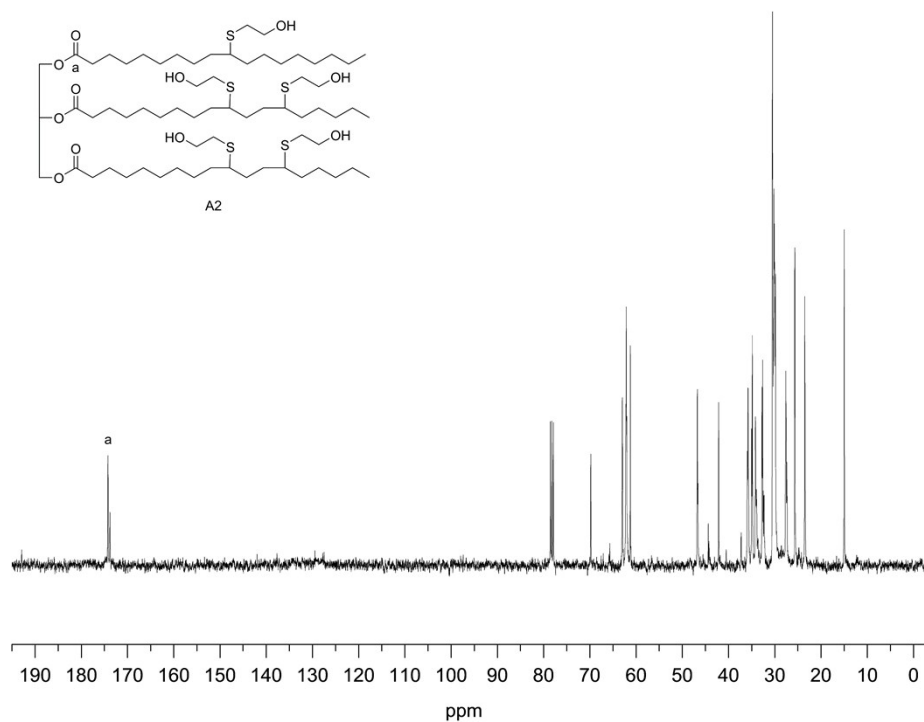


Figure S8 ¹³C NMR (400 MHz) spectrum of modified soybean oil (MSO)

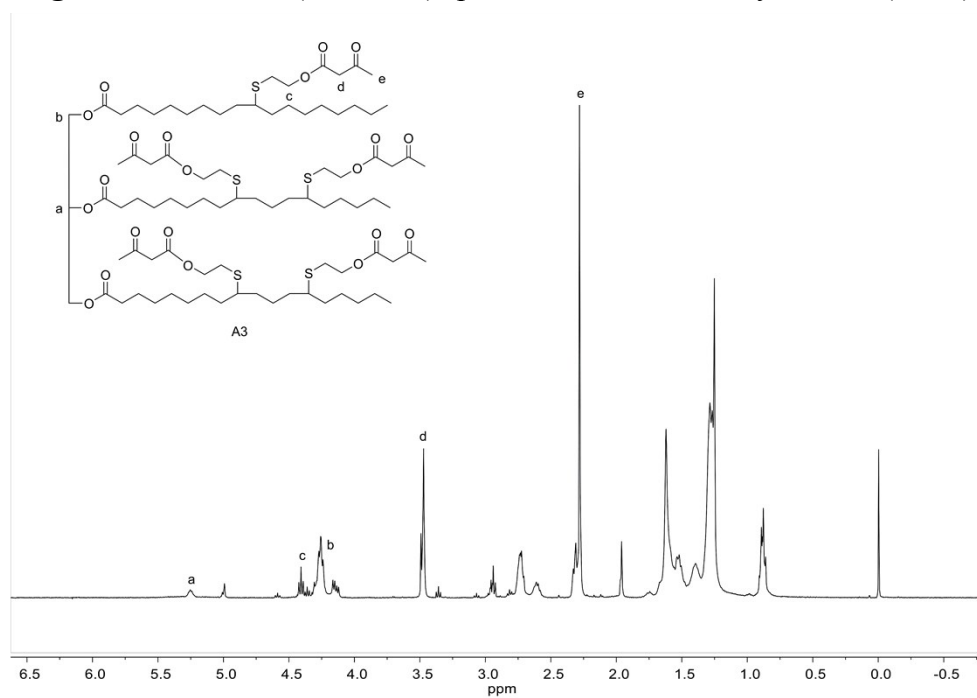


Figure S9 ¹H NMR (400 MHz) spectrum of acetoacetylated soybean oil (MA-SO)

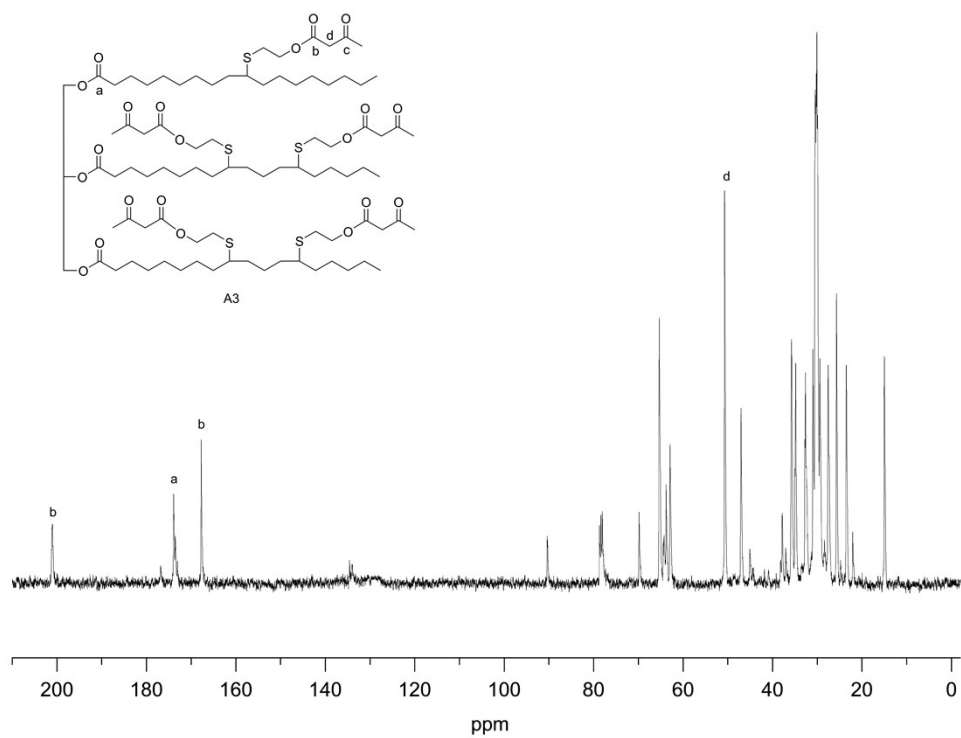


Figure S10 ¹³C NMR (400 MHz) spectrum of acetoacetylated soybean oil (MA-SO)