

### Electronic supplementary information

## A Novel Method for Creation of Free Volume in a One-Component Self-Assembled Monolayer. Dramatic Size Effect of *para*-Carborane

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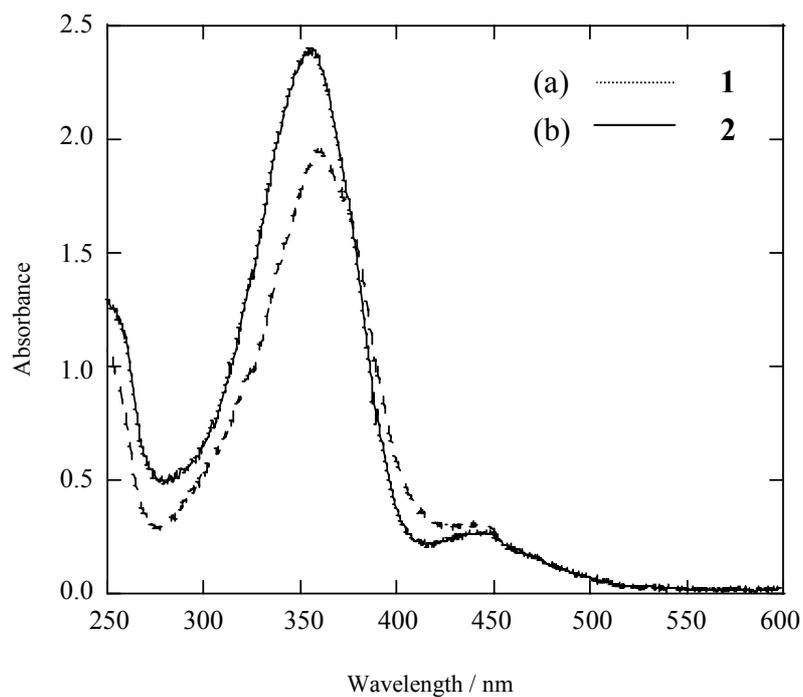
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### Experimental section

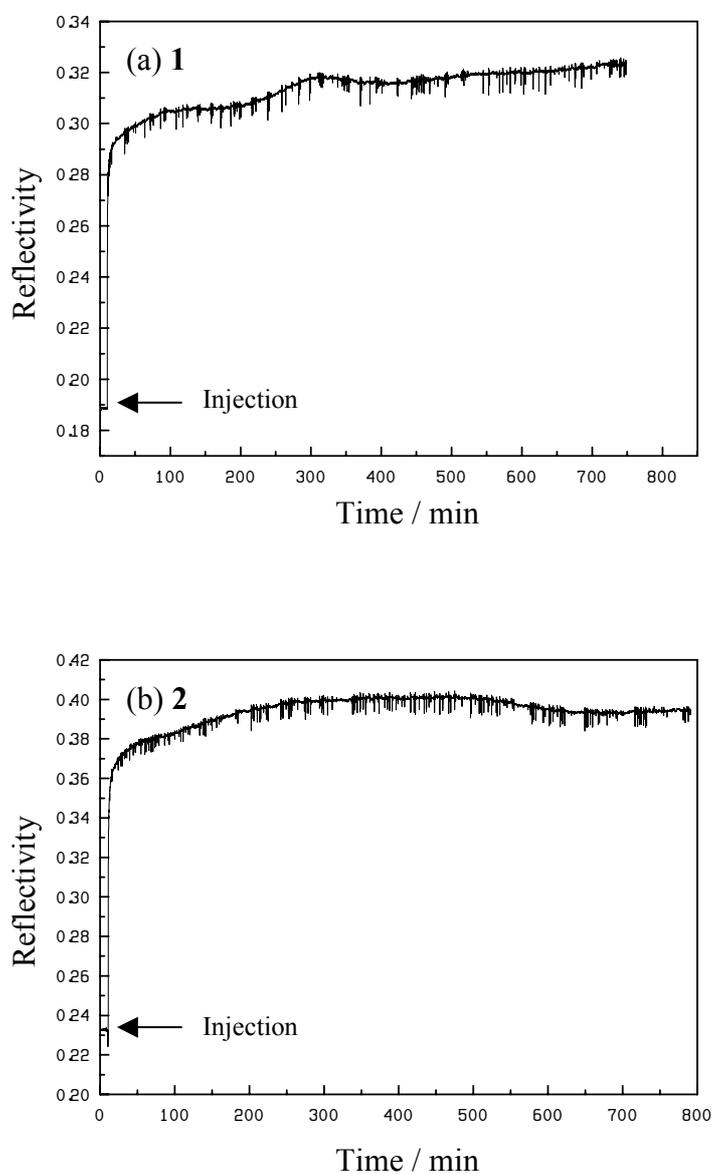
#### Instruments

FTIR-RA spectra were measured with Infinity Gold FTIR (Mattson Instruments). UV-vis absorption spectra were measured with a UV-vis spectrometer (HITACHI). SPR measurements of SAM were taken with a Surface Plasmon Spectrometer (Resonant Probes – Surface Analytical Instruments GmbH). A *p*-polarized He-Ne laser beam with a wavelength of 632.8 nm was used as an incident beam, and the setup was based on the Kretschmann and Raether configuration. In the photoisomerization reaction measurements of SAM, an ultrahigh-pressure mercury lamp (Nikon) with color filters was used as the UV (364 nm, 2.44 mW / cm<sup>2</sup>) and vis (440 nm, 2.70 mW / cm<sup>2</sup>) light source. <sup>1</sup>H NMR and <sup>13</sup>C NMR spectra were recorded on a JEOL JNM AL-300 (300 MHz) spectrometer. IR spectra were recorded on a SHIMADZU FTIR-8200A spectrometer. High resolution mass spectra were obtained on a HITACHI M-2500S, Bruker APEX spectrometer.





**Figure S1.** UV-vis absorption spectra of (a) **1** (dashed line) and (b) **2** (solid line),  $1.0 \times 10^{-2}$  mM in Chloroform.



**Figure S2.** Real-time adsorption kinetics of (a) **1** and (b) **2** onto the gold surface monitored by kinetics scan mode of SPR.