Atmospheric control for highly ordered self-assembly monolayer deposition of azobenzene

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Molecular switches engaged great attention for various field from biology to electronics, which exploited the transform property with external light. Azobenzene, the generally utilized with their photo-isomerization, was applied to electronic devices with self-assembly monolayer technique for surface modification by means of altered dipole moment. Many researches introduced functional group to change the electron density of thiol azobenzene, inducing the large dipole moment shift. However, the rare researches focused on the SAM treatment condition to obtain maximized conformation change of thiol azobenzene concerning with steric hindrance and arrangement. Herein, we investigated the atmospheric condition including temperature, humidity, and pressure for maximum conformational change which leads to large work function change. The thiol azobenzene SAM was measured by thin film UV-Vis spectroscopy, water contact angle, atomic force microscopy, and infrared spectroscopy. As a result, the delicate thiol azobenzene SAM treatment was highlighted to large work function change, applicable for the electronic device.