

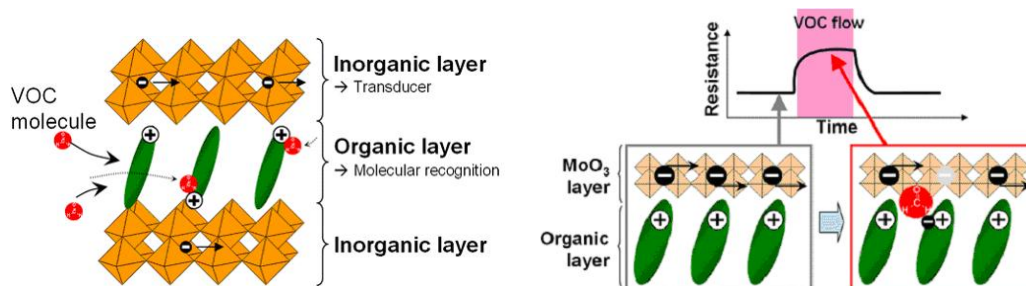
Inorganic-organic hybrid materials for gas sensors

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Organic/MoO₃ hybrids

Intercalative inorganic-organic hybrids with useful properties have attracted much attention owing to their potential applications in various kinds of devices. The development of thin film process is crucial to realize a novel device using the hybrid materials. Thin films of the intercalated organic/MoO₃ hybrids have been prepared by an ex-situ intercalation process. The host MoO₃ films were first deposited on substrates by using a CVD method followed by the intercalation of organic components into the MoO₃ films. The preparation of highly b-axis oriented MoO₃ films is essential to prepare the organic/MoO₃ films.



VOC gas sensors

The organic/MoO₃ films show semiconducting-like transport. The organic/MoO₃ films show a distinct response to VOCs by changing their electrical resistivity and exhibit higher sensitivities to aldehyde gases, whereas almost no response to toluene and xylene. The VOC sensing performance is closely related to the microstructure of the organic/MoO₃ thin films, which is able to be controlled by the growth conditions of the host MoO₃ thin films. Figure shows a sensitivity vs. gas concentration curve of (PANI)_xMoO₃ thin film sensor, the detection of formaldehyde gas with the concentration as low as 25 ppb.

