



Structural study of thin films of neutral and potassium-doped oligophenylenes on Cu(1 0 0)

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Abstract

Well-ordered thin films of *p*-oligophenylenes, *p*-quaterphenyl (4P), *p*-quinquephenyl (5P) and *p*-sexiphenyl (6P), were prepared on a Cu(1 0 0) single crystal substrate by vacuum vapor deposition. Their structures were investigated by infrared reflection absorption spectroscopy (IRRAS) and low energy electron diffraction (LEED). In the monolayers, *p*-oligophenylenes are physisorbed with their axes parallel to the substrate and form a regular two-dimensional arrangement. This structure is unaltered even in multilayers up to a thickness of a few nanometers. In the potassium (K)-doped 4P films, on the other hand, the arrangement is disrupted due to the perturbation by the dopant. The IRRAS investigation including observed and calculated spectra suggests that the radical monoanions are formed upon low-level doping, followed by saturation of the radical monoanion concentration and appearance of the dianions on increasing the amount of K.

Keywords: Low energy electron diffraction (LEED); Infrared absorption spectroscopy; Epitaxy; Growth; Aromatics; Copper; Low index single crystal surface



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