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Doping of Molecular Monolayers: The Impact of Potassium Atoms

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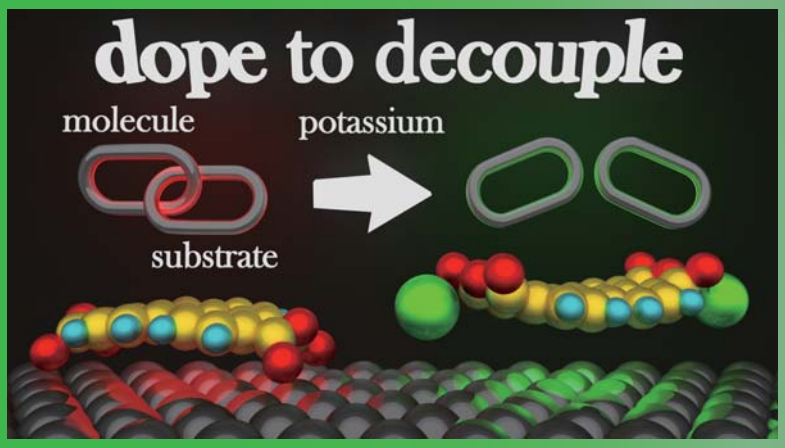
Date & Time: 27 Sept. 2018 (Thu.) 16:00
Place: IMS Research Building Room 201

This seminar is co-hosted with the JSPS invitational fellowship program.

Alkali metal atoms are frequently used for simple yet efficient *n*-type doping of organic semiconductors. However, the incorporation of dopants from the gas phase into molecular crystal structures needs to be controlled and well understood in order to optimize the electronic properties (charge carrier density and mobility) of the target material. Here, we report that potassium intercalation into the pristine 3,4,9,10-perylenetetracarboxylic dianhydride (PTCDA) monolayer domains on a Ag(111) substrate induces distinct stoichiometry-dependent structural reordering processes, resulting in highly ordered and large K_xPTCDA domains [1]. The emerging structures are analyzed by low-temperature scanning tunneling microscopy, scanning tunneling (hydrogen) microscopy (ST[H]M), and low-energy electron diffraction as a function of the stoichiometry. The doped thin films have been further characterized by PES, x-ray standing wave (XSW), and differential reflectance spectroscopy (DRS) [2]. All experimental results are consistently interpreted with the help of density functional theory (DFT) calculations [1,2].



[1] C. Zwick et al., ACS Nano 2016, **10**, 2365–2374.
[2] A. Baby et al., ACS Nano 2017, **11**, 10495–10508.

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