1C01

Kondo resonance observation of a stable radical molecule of 1,3,5-triphenyl-6-oxoverdazyl (TOV) adsorbed on Au(111)

Dept. of Chemistry, Tohoku University[1]; IMRAM, Tohoku University[2]

Liu Jie [1], Isshiki Hironari [1], Katoh Keiichi[1], Yamashita Masahiro [1], Breedlove Brian K.[1],Takaishi Shinya [1], Komeda Tadahiro[2]

[Introduction]

The application of the freedom of spin and charge of an electron to the quantum process of information is called 'spintronics'. Molecular spintronics is an emerging field that combines the molecular electronics and the spintronics. In there, various types of spin blocks have been proposed, which include organic radicals.

This is due to the versatility of the molecules which enables the positioning of the spins at designed sites. In addition, in analogy with photochromism and electrochromism, the realization of spin switching can be expected, which is due to the strong correlation between the structural configuration and electric properties of molecules.

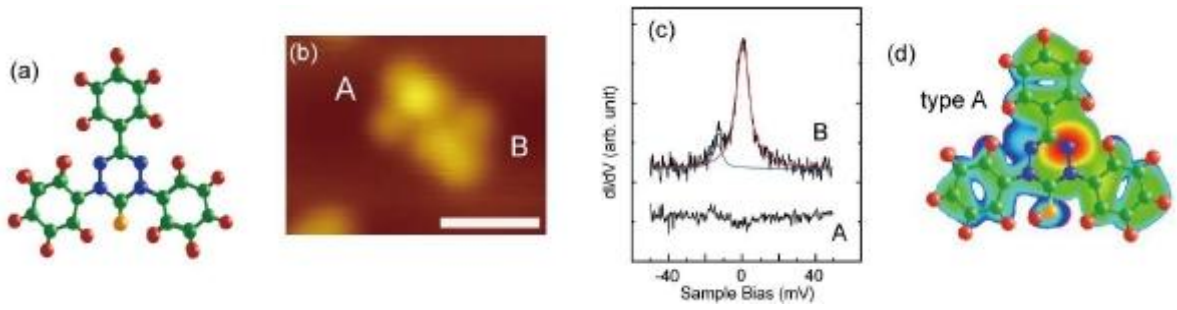
The origin of the magnetism in the organic radicals is an un-paired π electron. These radical molecules are composed of light elements, such as C, N, O, and S, which make the spin-orbit coupling effect negligible. Due to the weak spin-orbit coupling and hyperfine interactions, in electron transport, the spin coherent length is longer in the organic material than that in classical inorganic materials. This is one

of the reason why organic molecule is suitable for spin transport material.

[Experiment]

we try to detect a spin in a stable radical molecule adsorbed on a surface with an atomic scale resolution by observing Kondo state using scanning tunneling microscope (STM). Kondo resonance is caused by an interaction between an isolated spin and conduction electron. The detection of Kondo feature with scanning tunneling spectroscopy (STS) has been studied mainly for the metal atoms adsorbed on the surface, or caged in molecules. It was demonstrated that an unpaired π electron can cause Kondo resonance for the systems of the double-decker phthalocyanine, and the TCNQ molecules.

[Results and Discussion]



(a) Model of TOV molecule.

(b) STM image of TOV molecules, where type A and B molecules are specified.

(c) Kondo resonance observed on type B molecule.

(d) STM image simulation of type A molecule.