

## Interacting Electrons in Conducting Molecular Solids

Hidetoshi Fukuyama

Faculty of Science and Research Institute for Science and Technology (RIST), Tokyo University of Science

Scientific efforts for past 40 years to realize conducting states in solids consisting of neutral molecules have revealed fascinating variety of electronic states as condensed matter, which will be briefly reviewed in this presentation from the viewpoint of interaction effects. Charge carriers are introduced generally by charge transfer between donor and acceptor molecules, but there are now examples of metallic states in crystals consisting of a single kind of molecule, *single component molecular metals*. In these conducting states electrons are interacting among themselves and/or with lattices leading to interesting states, e.g. Peierls transition (accompanied by charge density wave) and spin density wave in quasi-1d systems, and Mott transition and charge ordering in 2d systems. Superconductivity is very common but with different characteristic features in each case. Moreover there are cases where conducting p electrons are coupled with d electrons, which either act as localized spins or mix strongly with p electrons, leading to unique phenomena, through which some possibilities are seen to emerge to understand functionality of some of metalloproteins based on electronic states.