ORGANOMETALLIC MOLECULAR DEVICES

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Abstract
Molecular devices have attracted increasing attention as an effective technique for miniaturization of electronic circuits. We have been studying development of *organometallic* molecular electronic devices, which are expected to show excellent performance by virtue of the contribution of the *d* electrons of higher energies included in the organometallic moieties. We have aimed at development of efficient molecular wires based on the *metallapolyyne* motifs (M + $(C{\equiv}C)_n$), which are able to undergo long-range conduction, and the performance has been evaluated by single molecule conductance determined by the STM-BJ measurement. Herein discussion will be focused on the following points with the goal of synthesis of long and highly conductive molecular wires.

1. Mononuclear molecular wire (≤ 2.2 nm) [1]
2. Di- and tri-nuclear molecular wire (≤ 3.5 nm) [2]
3. Longer dinuclear molecular wire (≤ 3.7 nm) [3]

As a result, we have achieved organometallic molecular wires with the conductance of 10^{-3} G_0 level as well as the molecular dimension close to 4 nm. Molecular switch characterized by nanogap technique will be also discussed.[4]

Keywords: organometallic molecular device, molecular wire, molecular switch, single molecule conductance, STM-BJ(break junction) measurement

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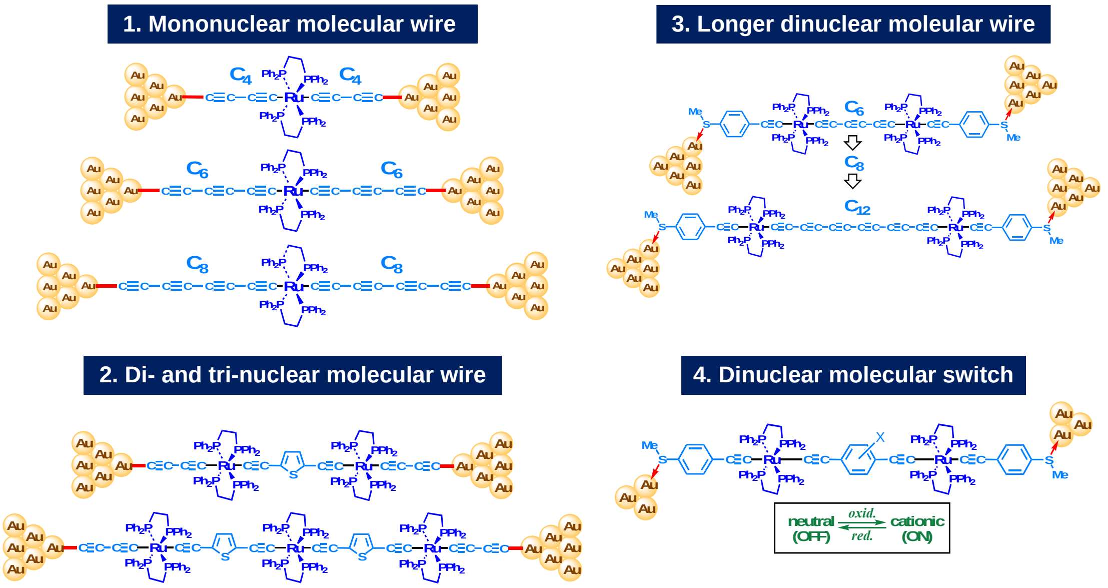

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