

Chemical Control of Electronic Coupling between Ruthenium Complex and Gold Electrode for Resonant Tunneling Conduction

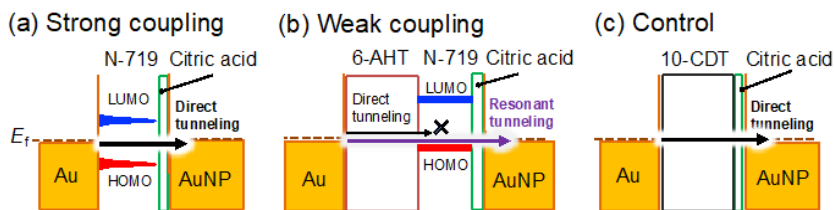
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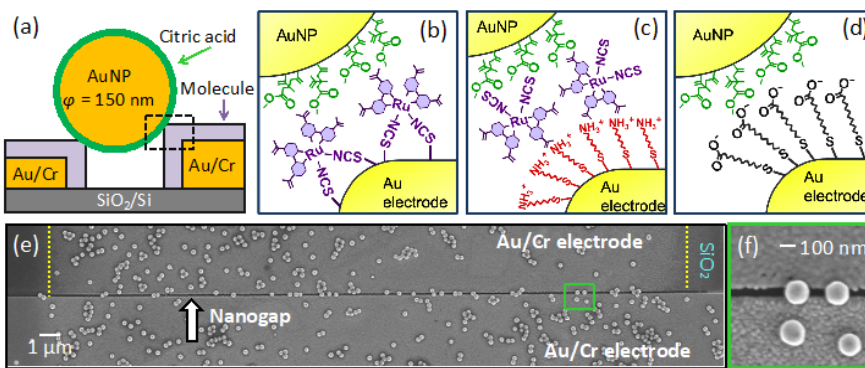
ABSTRACT:

- Current-voltage (*I-V*) nonlinearity is essential for information processing in molecular electronics.
- We used a nanoparticle bridge junction to investigate the effect of electronic coupling between a Ru complex and electrodes on nonlinear electrical properties.
- The device by inserting a spacer molecule between the Ru complex and the Au electrode realized nonlinear *I-V* characteristics with a clear threshold voltage and little zero-bias conductance. The *I-V* curves were well fitted by the resonant tunneling conduction model.
- The results show the significance of controlling the electronic coupling for nonlinear *I-V* characteristics.

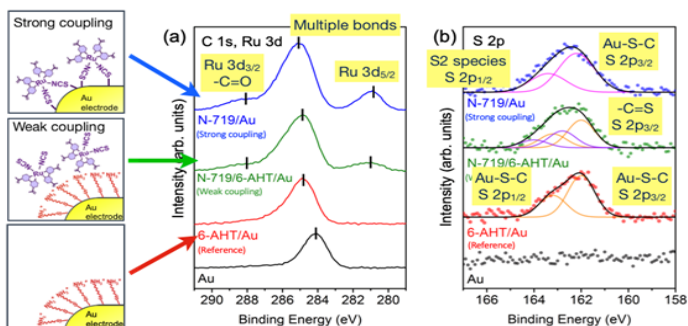
1. Device Design for Nonlinear *I-V* characteristics



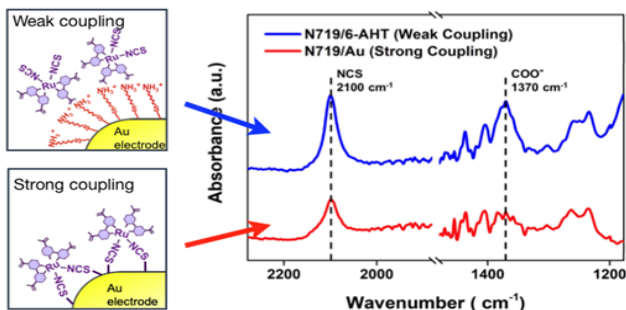
2. Nanoparticle Bridge Junctions



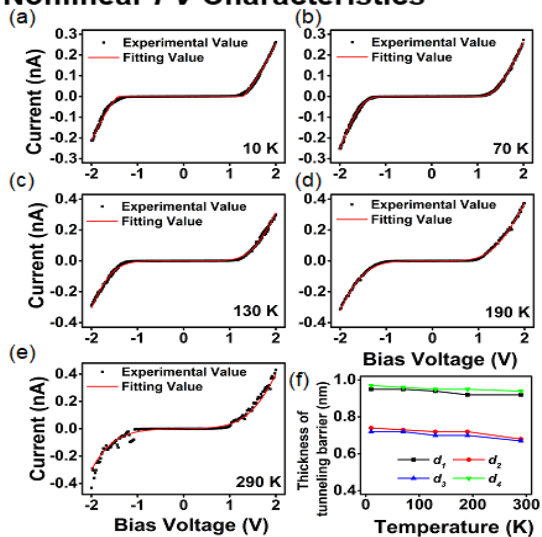
3. Evaluation of Molecular Layers by XPS



4. Evaluation of Molecular Layers by IRRAS



5. Nonlinear *I-V* Characteristics



Resonant Tunneling Conduction Model

