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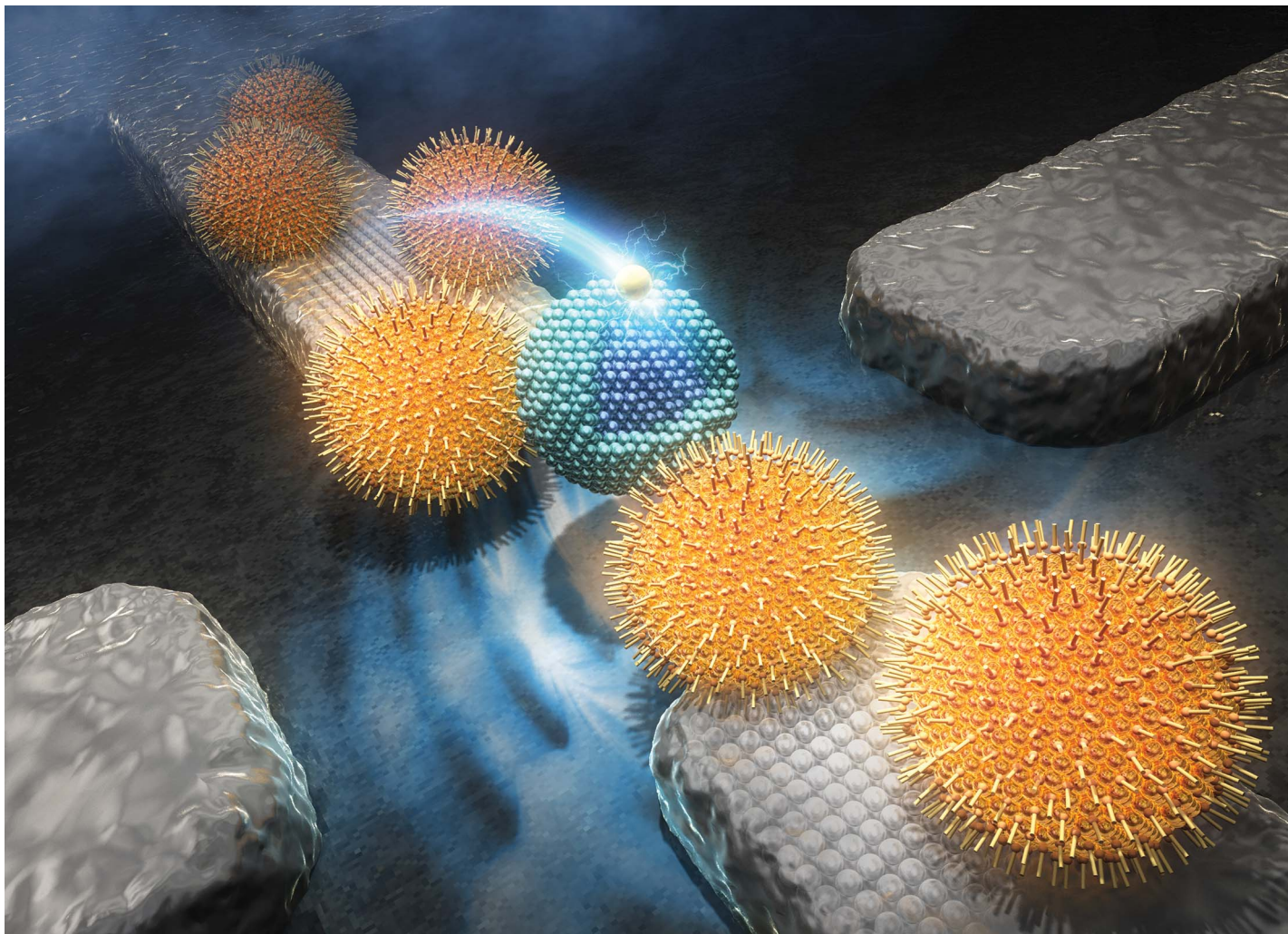
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Fundamental questions
Elemental answers



Showcasing research from Professor Yutaka Majima's laboratory, Institute of Innovative Research, Tokyo Institute of Technology, Yokohama, Japan.

Resonant tunneling in a colloidal CdS semiconductor quantum-dot single-electron transistor based on heteroepitaxial-spherical Au/Pt nanogap electrodes

A pioneering approach for a single quantum-dot (QD) transistor fabricated through chemisorption of colloidal CdS QD between the heteroepitaxial-spherical (HS)-Au/Pt nanogap electrodes is presented. A resonant tunneling was observed apart from the theoretical single-electron tunneling current by Coulomb blockade phenomena, which agreed with the theoretical resonant tunneling current through a discrete energy level of the QD. It suggests the coexistence of resonant tunneling current and single-electron tunneling current on a single QD device. This underscores the promise of HS-Au/Pt nanogap electrodes in realizing single-QD devices, offering a pathway toward unlocking their full potential.

As featured in:



See Yutaka Majima *et al.*,
Nanoscale Adv., 2024, 6, 4346.