

# Understanding Chemical Reactions Better from a Single-Molecule Perspective

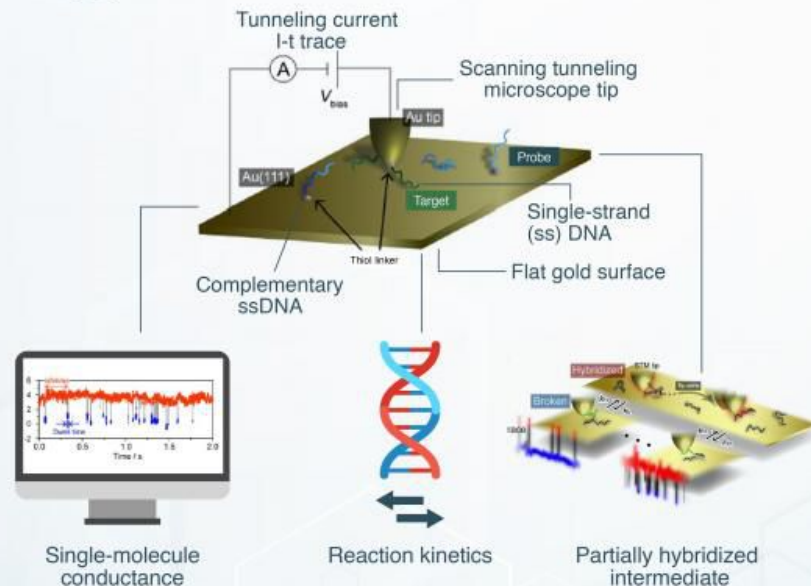
Direct monitoring of single-molecule reactions can reveal mechanistic insights



Can we make a polymer that converts mechanical energy into increased strength?



A single-molecule approach to DNA surface hybridization



DNA concentration  $\uparrow$



Hybridization efficiency  $\uparrow$   
(not seen for bulk samples!)

Single-molecule investigations can:



Shed light on reaction pathways



Unveil new chemical reactions



Improve performance of DNA-based logic devices

Elementary Processes of DNA Surface Hybridization Resolved by Single-molecule Kinetics: Implication for Macroscopic Device Performance

Harashima et al. (2020) | *Chemical Science* | DOI: 10.1039/D0SC04449K