New theoretical tool

Modelling electrical conduction in nanostructure assemblies through complex networks

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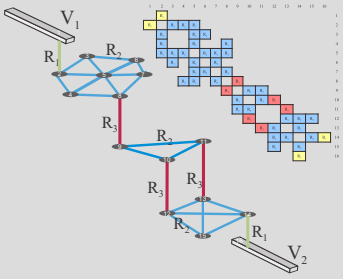
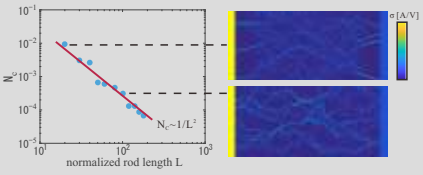
We applied complex network theory to investigate conduction through nanostructures of arbitrary geometry and morphology.



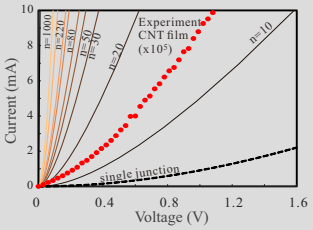
Testing simple constituents

Simulation of simple, rod-like particles shows good agreement with percolation theory



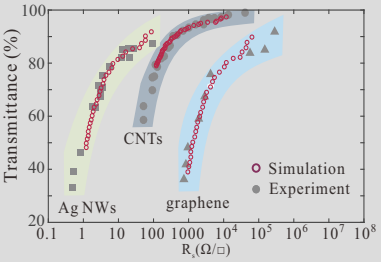
Understanding electrons

Complicated interplay of shape and properties can be considered



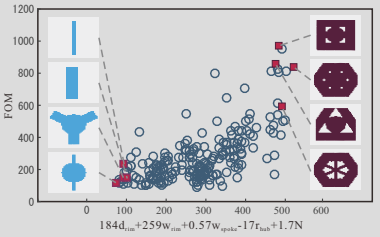
Characterizing real materials

Excellent agreement of simulation with experimental data reveals constituent properties.

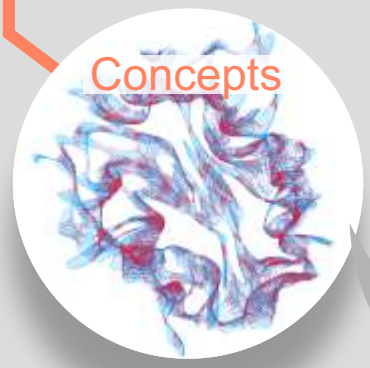


Predicting new materials

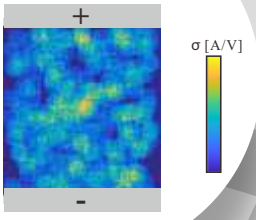
Our tool helps predicting what types of nanostructures will be best for electrode applications.



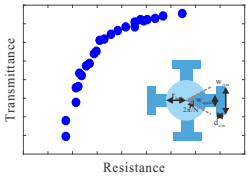
Concepts



Validation



Application



Introduction

Carrier transport in a wide range of nanomaterial assemblies proceeds by percolation through discrete constituents. Improving such nanostructure assemblies is crucial for transparent conductors, sensors, and electronic devices. A significant obstacle to experiments is the complicated characterization and the lack of theoretical understanding.

We have developed an approach to extrapolate from simple experimental characterization results to nanostructure properties.