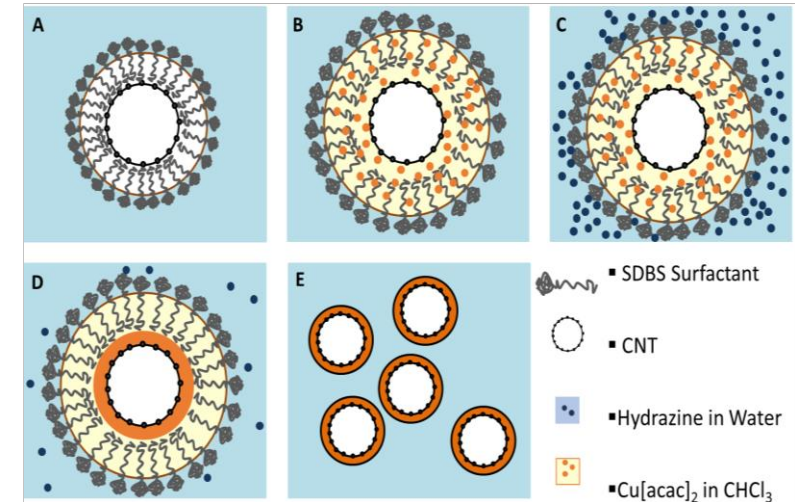


CABLE Conductor Manufacturing Prize



Team Name:	<i>Mainstream Engineering</i>
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Submission Title:	Metal-Encapsulated CNTs for Copper Wire



Description of Material

- Our approach uses a one-pot, solution-chemistry approach to CNT coating provides a scalable, low-cost method to increase metal-conductor conductivity and beat copper. By coating CNTs in the preferred matrix material we can reduce aggregation and improve interfacial interactions to increase composite conductivity and mechanical strength
- Copper power distribution cables are largely used in undergrounding applications which are expected to grow to more than \$20B by 2030

Fabrication Approach

- The solution chemistry approach takes advantage of the surfactant micelle around a aqueous suspension of CNTs. Metal nanoparticles are reduced onto the surface of the CNT by reacting metal salts at the boundary between the suspended CNT and the aqueous solution
- The CNTs can then be dried and integrated into powder metallurgy approaches to solidification and wire/cable fabrication

Potential Impact

- Increasing the conductivity and ampacity of underground power distribution cables reduces power loss during high current power distribution, decreases the copper needs for handling a desired current, and reduces green house gas emissions.
- Additionally increasing the strength of underground cables reduces failures, especially during installation, saving time and reducing cost.