

# ***Talk Math 2 Me***

## **Halloysite Nanotube Epoxy NanoComposites**

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11:00am–11:55am

### **Abstract**

Biological systems possess the unique capability of self-healing, which takes place both macroscopically (e.g. healing of a finger cut) and down to the single molecule level (e.g. DNA repair). In contrast, the vast majority of man-made materials were and are still developed based on the philosophy of preventing damage (i.e., adding reinforcers), rather than fixing/managing damage. Various approaches have been explored to achieve self-healing in polymers, most of which are based on the crack-filling mechanism where fluid substances (healing agents) fill damage zones and heal using a chemical/physical process. These healing agents can be encapsulated in capsules/hollow tubes and released once the capsules/tubes are ruptured by damage. The objective of this research is to solve this issue by using surface functionalized halloysite nanotubes (HNTs), which can be covalently integrated into the matrix and thus generating strong interface. In this way, load can be effectively transferred to the HNTs. They can serve to reinforce the matrix and thus preventing damage. Meanwhile, because of the strong interface between the matrix and the HNTs, if the matrix were to be damaged, the HNTs will be ruptured as well and the cracks should stop at the peripheral area of HNT ruptures, allowing healing agents to be instantly released to the most wanted damage zone. The research will include creating and testing, neat samples, HNT samples, and loaded HNT samples.

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