

# Strategic role of carbon nanotube functionalization on the multifunctional properties of structural epoxy nanocomposites

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## Abstract.

Carbon nanotubes (CNT) have received great attention as nanofillers for epoxy structural nanocomposites, due to their rare combination of mechanical, electrical, thermal properties, and others [1-2]. Furthermore, the CNT surface can be easily modified with various functional groups conferring specific and desired properties. Different kinds of functionalization can be performed, such as covalent and non-covalent functionalization. A very recent and hopeful strategy capable of modifying the surface of carbon nanotubes, without endangering their structural integrity, is the non-covalent functionalization of CNT walls with molecules having a strong affinity with CNT graphitic surfaces. The aim of this work is to enhance the interactions of CNT with epoxy matrices to allow much better nanofiller dispersion within the epoxy polymer through the CNT functionalization. The obtained results highlight that the performed functionalizations are suitable for designing carbon-based nanocomposites with improved structural and functional properties. Specific surface modifications of CNT walls were performed to advantageously activate reversible attractive interactions capable to impart self-healing efficiency to the nanocomposites. The Tunneling Atomic Force Microscopy (TUNA) technique has been used for investigating the morphology on nanoscale domains and the interactions at the interface between nanofiller and hosting polymeric matrix. The nanocomposite performance resulted strongly affected by the performed functionalization.

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## References

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