



39<sup>th</sup> IACDE  
National Conference

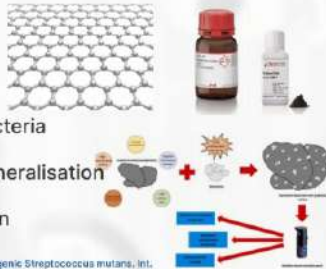


SMALL MATERIAL - BIG IMPACT

## Carbon Nanomaterials in Operative Dentistry & Endodontics

### GRAPHENE

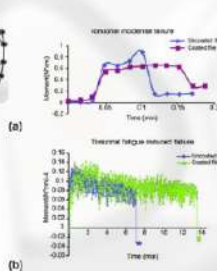
- 2D SP<sup>2</sup> hybridisation
- Application against cariogenic bacteria
- Application to prevent tooth demineralisation
- Application for tooth mineralisation



Mose M, et al. Graphene Oxide-Copper Nanocomposites Suppress Cariogenic *Streptococcus mutans*. *Int. J. Nanomed.* 2021

### FULLERENE

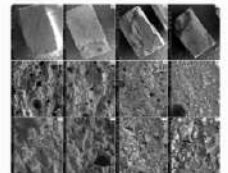
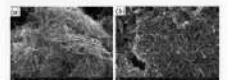
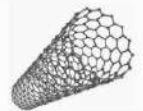
- Zero dimensional
- In dental restorations composite resins & bonding systems.
- Fullerene coated endodontic files improve treatment outcome



Adini, et al (2021). Alleviating fatigue and failure of NiTi endodontic files by a coating fullerene *Journal of Materials Research.*

### CARBON NANOTUBES

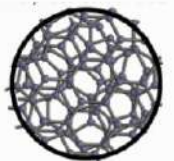
- One Dimensional hollow cylinder
- CNT incorporated endodontic sealer
  - Improved bonding performance to dentin
  - Improved performance against *E. faecalis* and *C. albicans*
- CNT incorporated GIC
  - Improve mechanical properties
  - Reduces risk of bulk fracture and secondary caries.



Spirito M, et al. Mechanical Assessment of Glass Ionomer Cements Incorporated With Multi-Walled Carbon Nanotubes for Improved mechanical properties-*Oral 2021*

### CARBON NANODOTS

- New root canal disinfectant against *E. faecalis*
- Helps in odontoblastic differentiation
- Anti inflammatory and antioxidant



Tang S, et al. Fucoidan-derived carbon dots as a disinfectant against *Enterococcus faecalis* biofilm for the treatment of persistent endodontic infections. *J Nano biotechnology* (2022)