

## Synthesis of nanodiamond reinforced dental composite resins and their mechanical properties

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To measure mechanical properties of dental composites reinforced by nanodiamond, three groups of independently synthesized dental composites were prepared with different diameter detonation nanodiamond (DND) clusters. DND cluster (100nm, 220nm and 500nm) were modified with  $\gamma$ -MPS, then added to matrix which was a mixture of Bis-GMA, TEGDMA, glass powder, CQ and DMAEMA, with DND content up to 0.25%. Flexural strength, elastic modulus and hardness were characterized for each material, using standard specification tests designed for the materials.

Mechanical properties of R-100 (resin with 100nm DND) were significantly lower than the other two groups, while R-220 and R-500 presented relatively higher values except at 0.25% content. Along with the increase of the content of diamond, flexural strength of all the three groups increased at first then reduced. Elastic modulus and hardness showed strong correlations with flexural strength except for elastic modulus of R-220, which had a higher value than that of R-500 at 0.25% content.

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