



Investigating the Effect of Adding ZrO₂ Nanoparticles on Physical and Mechanical Properties of Glass Ionomer Cements

Masuomeh Khaghani ^a, Ali Doostmohammadi ^b, Zahra Golniya ^c, Sohrab Rahpeyma ^a

^a Najafabad, Iran; ^b Shahrekord University, Iran; ^c Isfahan University of Technology, Iran

The aim of this work was evaluation of zirconia nanoparticles' effect on physical and mechanical properties of dental glass ionomer cements (GICs). Ceramic part of GIC was prepared using melting method and zirconia nanoparticles were added to GIC in 1, 3 and 5 weight percent. Characterization tests and compressive strength evaluation of nanocomposite samples were carried out. The XRD results showed that the prepared ceramic part of GIC was completely amorphous and can be used as the matrix of composite. The result of XRF showed that the chemical composition of ceramic part of GIC was similar to expected composition. Also the results of mechanical properties determination showed that the addition of zirconia nanoparticles to GIC will improve the compressive strength. The maximum of this strength was in GIC-1%wt zirconia composite. With increasing of the nanoparticles, the compressive strength was decreased but it was more than the strength of control sample. According to the results of this study, the most proper composite was GIC-1%wt zirconia nanoparticles. The final result of this study was obtaining GIC-zirconia nanocomposite which has improved compressive strength.