

Electrophoretic deposition of calcium silicate-reduced graphene oxide composites on titanium substrate - DTU Orbit (08/11/2017)

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Calcium silicate (CS)/graphene coatings have been used to improve the biological and mechanical fixation of metallic prosthesis. Among the extraordinary features of graphene is its very high mechanical strength, which makes it an attractive nanoreinforcement material for composites. Calcium silicate-reduced graphene oxide (CS-rGO) composites were synthesized, using an in situ hydrothermal method. CS nanowires were uniformly decorated on the rGO, with an appropriate interfacial bonding. The CS-rGO composites behaved like hybrid composites when deposited on a titanium substrate by cathodic electrophoretic deposition (EPD). Compared to a pure CS coating on Ti, the CS-1. wt% rGO coating has improved adhesion by 70%, hardness by 150% and the elastic modulus by 240%. The CS-rGO composite coatings exhibit good apatite-forming ability in simulated body fluid (SBF). Moreover, the effect of addition of rGO on morphology, adhesion and proliferation of human osteoblast cells (hFOB) was investigated in vitro.

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