Synopsis of Original Research Paper

Preparation of inorganic-organic hybrid nanoparticles by chemical modification of milk protein, casein

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Nanoparticles composed of biopolymers have received much attention as a useful material applicable to a variety of industrial fields. We focused on casein proteins, which are associated and assembled into an organic and inorganic supra-structure. We could prepare nanoparticles of beta-casein coupled with polyethylene glycol (PEG) by changing pH, temperature, and Ca^{2+} concentration. Since the obtained nanoparticles were soluble at body temperature, we tried to produce calcium phosphate as a cross-linker in a nanoparticle. The obtained particles had a diameter of approximately 100 nm at pH 7.4 and kept stable over a wide range of temperature. Phosphorous could be detected inside the nanoparticle with XPS and EDX measurements. It was also found that nanoparticles were disrupted by lowering pH from pH 7.4 to 4.0.