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Abstract
This study is to fabricate there dimensional porous scaffolds through freeze-drying method by completely mixing of either polylactic-co-glycolic acid (PLGA) or PLGA-OH, dioxane and water. It's biocompatibility and mechanical properties could be enhanced by adding hydroxyapatite (HAP) and nano-SiO2. The different ratio of dioxane and water, dipping temperature, and the concentration of PLGA on the effect of morphology, porosity, pore size, and degradation test of scaffolds were investigated in this study. The SEM results showed that the pore size changed with different reaction conditions. The pore size of scaffolds which was dipped at 4°C for 30 minutes was uniform when the ratio of dioxane and water was 9：1. The pore size and porosity were 107.2 μm and 82.4% in 10 % PLGA(w/v), and those were 108.7 μm and 83.7% in 10 % PLGA-OH(w/v). The addition of HAP and nano-SiO2 would not change the structure of pore and synthesis procedure of the scaffolds. The XRD peak of HAP decreased when the amount of nano-SiO2 increased. The compression test results revealed that the strength of scaffolds increased with nano-SiO2, and the compression modulus was 18MPa. The degradation of scaffolds with HAP and nano size SiO2 addition could sustain up to 16 weeks.
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