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# Controlled Synthesis of Hydroxyapatite Microspheres with Hierarchical Structure and High Cell Viability

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**Abstract:** Monodispersed vaterite CaCO<sub>3</sub> microspheres with regular morphology were synthesized by a fast precipitation method in the presence of sodium carboxyl methylcellulose, and then used as a template to induce the formation of hydroxyapatite microspheres in a hydrothermal reaction. By regulating reaction temperature and amount of surfactant sodiumdodecyl benzene sulfonate, the secondary nano building blocks of hydroxyapatite microspheres can be accurately controlled between nanoplates and nanorods. Based on XRD, FTIR and HRTEM characterizations, a possible transformation mechanism is proposed. In vitro cell experiments show that hydroxyapatite microspheres with hierarchical structure produce significantly high cell viability. Moreover, the hydroxyapatite microspheres with nanoplates promoted cell reproduction better than those with nanorods.

**Keywords:** controlled; hydroxyapatite microspheres; nanoplates; nanorods; high cell viability.

## 1. Introduction

Over the last decade, hydroxyapatite microspheres (HAMs) with hierarchical structure assembled

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