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Sacrificial Crystal Templating of Hyaluronic Acid-Based Hydrogels

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**Title:** Sacrificial Crystal Templating of Hyaluronic Acid-Based Hydrogels.

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**ABSTRACT:**

Natural tissues have intricate structures organized in a hierarchical fashion over multiple length scales (Å to cm). These tissues commonly incorporate pores as a key feature that may regulate cell behavior. To enable the development of tissues scaffolds with biomimetic pore structures, it is important to investigate methods to impart pores to biomaterials, such as the use of novel sacrificial porogens. Here we report the use of sacrificial crystals to impart pores to biopolymer hydrogels (based on a methacrylated hyaluronic acid derivative) with macroscopic crystal templated pores embedded within them. The pore structure was investigated using microscopy (cryoSEM and confocal), and the specific sacrificial porogen used was found not only to impact the pore structure, but also swelling and mechanical properties. Such templated hydrogels have prospects for application as instructive tissue scaffolds (where the pore structure controls cell alignment, migration etc.).

**Keywords:** hydrogel; sacrificial porogen; pore structure; tissue scaffold; biomaterials

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