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# Photoinduced crystallization of calcium carbonate from a homogeneous precursor solution in the presence of partially hydrolyzed poly(vinyl alcohol)

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**ABSTRACT:** Photoinduced crystallization of calcium carbonate ( $\text{CaCO}_3$ ) was demonstrated by the photodecarboxylation of ketoprofen (KP, 2-(3-benzoylphenyl)propionic acid) under alkaline conditions (pH 10). In this method, a homogeneous solution comprising KP, calcium chloride, ammonia, and partially hydrolyzed poly(vinyl alcohol) ( $\text{PVA}_{\text{PS}}$ , degree of saponification: 86.5–89.0 mol %) was used as the precursor solution and was exposed to ultraviolet (UV) irradiation for different time periods. Thermogravimetric analysis of the obtained xerogels showed that increasing the UV irradiation time increased the amount of  $\text{CaCO}_3$  formed and the complete conversion of calcium ions to calcite was achieved after 50 min of UV irradiation. Furthermore, solid phase analyses suggested that nanometer-to-micron-sized calcite crystals were formed and dispersed in the obtained  $\text{PVA}_{\text{PS}}$  matrix.

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