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Platinum and platinum hydroxide nanomaterials by laser ablation in liquids WILLIAM NICHOLS, TAKESHI SASAKI, NAOTO KOSHIZAKI, Nanoarchitectonics Research Center, AIST — Recently, laser ablation has been extended to solid targets immersed in liquids to enhance the variety of reactions possible as well as to use the rapid quenching in the solution to stabilize metastable phases. To control the ablation and reaction conditions it is imperative to have an understanding of how the laser parameters effect the nanomaterial formation. Here, we report the effect of wavelength and fluence on the ablation mechanism and chemical reactivity during laser ablation of a platinum target immersed in water. Results suggest the ablation mechanism can be changed among thermal, explosive and reactive sputtering by choice of fluence. Further, control of the reactivity of ablated species in the water is also possible through proper selection of laser parameters. We discuss the formation of platinum hydrogels through reactive quenching of the laser-ablated species by the water followed by crystallization into platinum oxide based nanomaterials.

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