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- Study Fields：

- Surface-enhanced Raman scattering based on noble metal nanoparticles and their nanocomposites

- Application of noble metal nanoparticles and their nanocomposites prepared utilizing electrochemical methods

- Creation of plasmon-induced activating water and its application in medicine and green energy

- Representative cited papers：

- 1. Hsiao-Chien Chen, Bing-Joe Hwang, Fu-Der Mai, **Yu-Chuan Liu***, et al., “Active and Stable Liquid Water Innovatively Prepared Using Resonantly Illuminated Gold Nanoparticles”, ACS Nano, 8, pp. 2704-2713 (2014).

- 2. Hsiao-Chien Chen, Fu-Der Mai, Kuang-Hsuan Yang, Hui-Yen Tsai, Chih-Ping Yang, Chien-Chung Chen, Chao-Hsuan Chen and **Yu-Chuan Liu***, “Environmentally friendly etching agent: vapor from hot electron-activated liquid water”, Green Chemistry. 18, pp. 3098-3105 (2016).

- 3. Hsiao-Chien Chen, Chung-Yi Cheng, Hsiu-Chen Lin, Hsi-Hsien Chen, Cheng-Hsien Chen, Chih-Ping Yang, Kai-Huei Yang, Chun-Mao Lin, Tsung-Yao Lin, Chwen-Ming Shih and **Yu-Chuan Liu***, “Multifunctions of Excited Gold Nanoparticles Decorated Artificial Kidney with Efficient Hemodialysis and Therapeutic Potential”, ACS Appl. Mater. Interfaces. 8, pp. 19691-19700 (2016).

Title: Recent advances in plasmon-activated water

Abstract: The strength of hydrogen bonds (HBs) decides water's properties and activities. It is recognized that the properties of confined liquid water, or liquid water in contact with hydrophobic surfaces, significantly differ from those of bulk liquid water. However, these unique properties of water are only found within the interfacial phase and a confined environment; thus, their applications are limited. Nowadays, health and energy are two main concerns in the world. In this review based on ten published papers by our group, we report an innovative and facile method for preparing mass-produced plasmon-activated water (PAW) with reduced HBs by letting bulk water flow through gold-supported nanoparticles (AuNPs) under resonant illumination at constant temperature. The resulting stable PAW exhibits distinct properties and activities, which significantly differ from those of untreated bulk water. The creation mechanism of PAW, its health benefits, and effective energy productions are discussed. Also, progress with PAW applications in health and energy fields is proposed. This ensures that PAW is applicable to various water-related fields to investigate innovative aspects of the effects of liquid PAW.