

Editorial

Editorial for Special Issue on ‘Light–Particle Interaction: Thermoplasmonics, Photoacoustics, Photochemistry, and Their Applications’

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With the rapid development of nanotechnology, there has been an increasing interest in the research and applications of nanomaterials. Nanomaterials have shown unique and interesting features compared to their bulk counterparts, among which, the phenomena induced by light–particle interactions have attracted the attention of researchers in various fields. When the nanomaterials are illuminated by light, heat is generated due to the dissipation of light. The increase in the temperature of the particles will lead to a series of effects including nanoscale heating, electron excitation, pressure wave generation, and nanobubble generation, thereby triggering their applications in different fields ranging from biomedicine to energy harvesting. To be more specific, the light–particle interaction is extremely important in the applications of photothermal therapy, bioimaging, SERS, particle manipulation, radiative cooling, and solar energy utilization including solar water splitting, solar thermal harvesting, solar cells, solar water treatment, and many more. According to the Web of Science, the scientific papers published every year using the theme of ‘nanomaterials/particles’ and ‘light’ have exceeded 200 thousand since 2019, and this number keeps growing. In the concept of the ‘light–particle interaction’, ‘light’ does not only refer to visible light. It can also include a wide waveband ranging from ultraviolet to infrared. Some of the most recent reviews have summarized the state-of-the-art technologies in the field of thermoplasmonics [1–3], photoacoustics [4,5], and photochemistry [6,7]. It is certain that further basic and applied investigations are still urgently needed to deepen our understanding of the multi-physics problems involved in the light–particle interactive process, which could then promote the development of current technologies and expend their applications.

The aim of this Special Issue is to cover the most recent achievements in the field of the light–particle interaction, including fundamental research in the fields of thermoplasmonics, photoacoustics, photochemistry, and their possible applications.

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