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Near-Infrared Photo thermal Therapy Cancer Treatment Assisted with Grapheme-Based Materials

Faith Cheung

Richard Montgomery High School, USA

Photo thermal therapy is an emerging method of cancer treatment in which tumours are ablated by heating agents using near-infrared light (700–1000 nm). A semiconductor with a band gap between 0.3–0.7 eV would, therefore, efficiently emit near-infrared light. The new "magic" material grapheme has a band gap of zero, which is advantageous with regard to designing a new material with a suitable band gap for the emission of near-infrared light. In our investigations, using the first-principles density functional theory calculation method, we aimed to and successfully designed grapheme-based materials with a direct band gap of 0.68 eV. They have the potential to be optimal and efficient near-infrared light sources due to their narrow yet fitting band gap. The present results open up a new avenue for the application of grapheme-based materials to assist in photo thermal therapy.

Biography

Faith Cheung is a high school senior and a candidate of the IB program at Richard Montgomery High School, Rockville, MD. For the past few years, Faith has conducted research in the area of nanomaterial and specifically grapheme, and its application in the medical field. Her discovery was published in the peer-reviewed scientific journal Heliyon in 2020. She continues investigating nanotechnology and quantum material.