

Synthesis and Characterization of Boron and Boron Carbide Nanoparticles using the Pulsed laser Ablation in liquid for Boron Neutron Capture therapy

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Boron and its compounds have distinct properties that allows them to be used extensively in various fields. Their non-toxicity has made them attractive in the healthcare and cosmetic industry [2]. Boron and Boron Carbide nanoparticles synthesized at room temperature by pulsed laser ablation in liquid method have shown to give smaller <100nm non-toxic particles with good chemical stability. These nanoparticles could be explored in the application of boron neutron capture therapy (BNCT). This therapy targets only boron/ boron compound bearing cancer cells through a low-energy thermal neutron beam (0.025 eV) without killing the neighbouring normal tissue [1]. The neutron beam interacts with the deposited boron/ boron compound in the tumor cells, causing it to split into an alpha particle (4He) and the recoiling of lithium nucleus (7Li), which are stable nonradioactive isotopes [2]. Boron target will be synthesized and the nanoparticles shape, size and optical properties characterized for this study.

Keywords: nanoparticles, non-toxicity, laser, ablation, neutron

References

- [1]. Cheng, X., Li, F., & Liang, L. 2022. Boron Neutron Capture Therapy: Clinical Application and Research Progress. *Current Oncology*, 29(10), 7868–7886.
- [2]. Tatiya, S., Pandey, M., & Bhattacharya, S. 2020. Nanoparticles containing boron and its compounds—synthesis and applications: A review. *Journal of Micromanufacturing*, 3(2), 159–173.

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