

Laser assisted deposition of AgInSe₂ films on Si(100)

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Laser ablation has attracted special interest for the formation of thin films. Compared with other formation techniques, a distinctive feature of laser ablation is that it allows high quality and stoichiometry of films of even very complex element material. In this presentation, laser ablation of AgInSe₂ chalcopyrite semiconductor will be discussed in which it is difficult to maintain stoichiometry by conventional methods. High Quality AgInSe₂ (AIS) films were grown on Si(100) substrates by the ultra-high-vacuum pulsed laser deposition technique from the AIS target synthesized from high-purity materials. The X-ray diffraction studies of the films show that films are textured in (112) direction. The substrate temperature appears to influence the properties of films. Increase in substrate temperature results in more ordered structure. Compositional analysis has been carried out by EDAX. It is observed that compositional stoichiometry is maintained to a more extent by PLD technique than other traditional methods like thermal evaporation. The optical studies of the films show that the optical band gap is about 1.20 eV.

New Structural Model of Malaria Pigment

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The crystal structure of five-coordinate high-spin iron(III) Fe(OEP)picrate has been studied as a model system for malaria pigment due to intense interest in the molecular structure of malaria pigment (hemozoin) which is indistinguishable with β -hematin. To examine the conformation of porphyrin plane and ethyl groups substituted in *beta*-pyrrole positions with a picrate as axial ligand was studied by single crystal X-ray crystallography and resonance Raman spectroscopy. The macrocyclic porphyrin structure is the out-of-plane normal deformations of the saddle-shaped. The axial ligand orientation is the role in controlling the unequal distance of Fe–N bond (2.040(2), 2.028(2), 2.055(2), and 2.053(2) Å). The distance of axial Fe–O bond is 1.93(2) Å. The Fe(OEP)picrate molecules interact in pairs via π – π stacking interaction and nitro-nitro interaction. Fe(OEP)picrate exhibits the enhancement of totally symmetric oxidation state marker band, ν_4 at 1370 cm⁻¹ for ν (pyr half ring) when using near-IR excitation laser and the characteristic bands of *beta* substituted hemes in the ranges of 1621–1639 for ν (C _{α} C _{m})_{asym} and 750–756 cm⁻¹ for ν (pyr breathing) similar with β -hematin.

Crystal data for Fe(OEP)picrate: C₄₂H₄₆FeN₇O₇, monoclinic space group *C2/c*, $a = 26.3997(20)$, $b = 13.7806(18)$, $c = 25.4126(20)$ Å, $\beta = 119.955(9)^\circ$, $V = 8010.2(14)$ Å³, $Z = 8$ at 298 K.