

**STRUCTURAL CHARACTERISATION ON THE NANOPARTICLE
DOPING OF CERIUM (IV) OXIDE (CeO₂) INTO YBCO
SUPERCONDUCTOR**

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ABSTRACT

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This report present the study of structural characterization on the nanoparticle doping of Cerium (IV) Oxide (CeO₂) into Y_{1-x}Ce_xBa₂Cu₃O₈ superconductor. The samples with varying value of Ce ($x = 0.00, 0.02, 0.05, 0.10$ and 0.20) were prepared by using solid state method. The samples were characterized by using X-ray diffraction (XRD). The peak shifting, lattice parameter and its orthorhombicity were determined by using the data obtained from the XRD pattern. Pure sample ($x = 0.00$) was observed to have the highest value of lattice parameter a , c and highest unit cell volume which are 3.8491 \AA , 11.7385 \AA and 175.0778 \AA^3 respectively. Meanwhile, the lattice parameter b of pure sample were in between of samples which have its x -value of 0.01 and 0.05 . Generally, the trend of lattice parameter for a , c and its unit cell volume decreases as the x -value increases whereas the lattice parameter of b for each samples increases as the x -value increase. The XRD pattern shows that all samples exhibit orthorhombic structure and peak at $2\theta = 32^\circ$ is shifted between $[013]$ and $[103]$ plane as the x -value increases.

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