

## Structural and electrical properties of YBa<sub>2</sub>Cu<sub>3</sub>O<sub>7-δ</sub>/CuMn<sub>2</sub>O<sub>4</sub> composites

**Rasha Yousef**

Al-Baath University, Syria.

**Statement:** The pure YBa<sub>2</sub>Cu<sub>3</sub>O<sub>7-δ</sub> (YBCO), CuMn<sub>2</sub>O<sub>4</sub> (CMO) and YBCO(x wt% CMO) composites were prepared by the solid state reaction method. The structural properties of all composites were studied using the XRD technique. The matching process revealed the presence of the orthorhombic phase of pure YBa<sub>2</sub>Cu<sub>3</sub>O<sub>7-δ</sub> compound. It was found that all the YBCO(x wt% CMO) composites have an orthorhombic Pmmm symmetry. There was no orthorhombic-to-tetragonal phase transition detected up to x = 3 wt%. The values of the lattice constants are determined. The values of crystallite size decreased with increasing of CMO concentration. The values of oxygen content were close to 7 for all YBCO(x wt% CMO) composites, which confirm that no orthorhombic–tetragonal transition was occurred. The electrical resistance measurements of the YBCO(x wt% CMO) composites as a function of temperature were done. The superconducting transition has occurred to the samples with (0 ≤ x ≤ 0.3)wt% above 77°K. The gradual decrease of T<sub>c</sub> observed in the composites with x less than 1wt%, but their values remain close to the T<sub>c</sub> values of the pure compound.

**Key words:** High T<sub>c</sub> Superconductors -Composite- Solid state reaction method - YBa<sub>2</sub>Cu<sub>3</sub>O<sub>7-δ</sub>-Cuprates compounds.

### Biography

Rasha Yousef is a dedicated academic and healthcare professional affiliated with Al-Baath University in Syria. With a deep commitment to advancing nursing education and clinical practice, Dr. Yousef has played a vital role in nurturing the next generation of nurses through both teaching and research. Her academic journey is marked by a profound interest in areas such as patient-centered care, nursing ethics, and community health. She has contributed to several research projects and educational initiatives aimed at enhancing the quality of healthcare delivery in Syria and the broader Middle Eastern region. Throughout her career, Dr. Yousef has been an active participant in academic conferences and seminars, where she shares insights on best practices in nursing education, evidence-based care, and health promotion strategies. Her collaborative approach and dedication to lifelong learning make her a respected figure among colleagues and students alike.

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