

## Abstract

The first truly high temperature ceramic superconductor is composed of Yttrium, Barium, Copper and Oxygen (YBCO). The copper oxide networks play a major role for the occurrence of superconductivity. We present a possible pairing mechanism in YBCO-123 materials. Different models like; Resonance valence bond, spin fluctuation and t-j models have been used to explain superconductivity but have not fully explained the behavior of these materials in the superconducting state. At present there exists no alternative model that can predict maximum critical temperature in these materials. The thermodynamic properties of YBCO-123 have been studied using the Bogoliubov-Valatin formalism approach. In this research s-wave singlet and p-wave singlet pairing admixture has been studied. Two jumps in the specific heat were noted at  $T_C = 65\text{K}$  and  $T_C = 284\text{K}$ . Specific heat for the admixture was found to be  $5.9 \times 10^{-27} \text{ J/K}$  at  $T_C$ . These measurements are important in understanding the electronic excitations close to quantum phase transitions. This study is a step towards realizing room temperature ( $T_C = 298\text{k}$ ) superconductors which will bring in great technological advancement.