

## Abstract

Electron interaction near the critical temperature is viewed as a contributor to the establishment of the energy gap which of late is projected to be a harbinger to explaining microscopic mechanism behind High temperature superconductivity. This study investigated the effects of the number of planes of CuO<sub>2</sub> on the thermodynamic properties of double Tl-O layered compounds: Tl<sub>2</sub>Ba<sub>2</sub>CaxCuyOz (Tl<sub>2</sub>XY) High temperature superconducting cuprates due to an interaction between a Cooper Pair and an electron. The energy of interaction at the critical temperature (T<sub>c</sub>) was seen to increase with increase in the number of CuO<sub>2</sub> planes. The specific heat per unit mass, Sommerfeld coefficient as well as the entropy per unit mass, decreased with an increase in the number of CuO<sub>2</sub> planes. The peak Sommerfeld coefficient temperature (T<sup>\*</sup>) was noted to be approximately 0.66T<sub>c</sub> in all considered cases of Tl<sub>2</sub>XY.