

PHASE EQUILIBRIA DETERMINATION OF
TRIS(HYDROXYMETHYL)AMINOMETHANE AND 2-AMINO-2-METHYL-1,3-
PROPANEDIOL BINARY SYSTEM

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Abstract

X-ray diffraction and differential scanning calorimetry (DSC) studies of tris(hydroxymethyl)aminomethane (TRIS, $C_5H_{10}NO_3$) and 2-Amino-2-methyl-1,3-propanediol (AMPL, $C_4H_{11}NO_2$) binary system were investigated. Both of these organic compounds are the important thermal energy storage materials. The X-ray and DSC results show that the solid state phase transition (α -monoclinic to γ -BCC) of AMPL occurs at 77.8°C and TRIS (β -orthorhombic to γ -BCC) at 133.7°C . The single α -AMPL solid solution phase region is from 0% to 15%TRIS up to 71°C , and the single β -TRIS phase region is from 85% to 100%TRIS up to 128°C . In the middle composition range, it shows that the α -AMPL+ β -TRIS two phase region was found from 15%TRIS to 85%TRIS up to $\sim 74^\circ\text{C}$. The γ -AMPL+ β -TRIS two phase region was found from 75°C to 120°C . The volume expansion of β -TRIS phase of 90TRIS-10AMPL sample was calculated to be 606.78 to 611.02 cm^3 for the temperature range from 35°C to 120°C , and the α -AMPL phase of 10TRIS-90AMPL sample was from 578.53 to 583.61 cm^3 for the temperature range from 35°C to 70°C . A proposed experiment AMPL-TRIS binary phase diagram is constructed. Detail results of lattice parameter calculations and AMPL-TRIS phase diagram will be presented.