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Structure and Resistivity of FeNi Binary Alloys

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Abstract : The crystal structure and resistivity of polycrystalline alloys viz. $Fe_{0.5}Ni_{0.5}$, $Fe_{0.4}Ni_{0.6}$, $Fe_{0.3}Ni_{0.7}$, $Fe_{0.1}Ni_{0.9}$ obtained by arc-melting are investigated by x-ray diffraction and four probe methods respectively. Structural studies on the alloys indicated a structural transformation from bcc to fcc with composition. Alloys with Ni content less than 30% are in bcc phase stabilized by bcc iron and alloys of Ni content more than 30% are found to be in fcc phase stabilized by fcc Ni. Metallicity is found to increase with the increase of Ni content in these alloys. Residual resistivity decreases with Nic concentration.

Keywords: Arc-melting, resistivity, phase diagram, phase transition

[Full Paper]