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Influence of Fe on Microstructure and Physical Properties of $Cu_{90-x}Fe_xPd_{10}$ Ternary Alloys with $x = 5$, 10, 15, and 20

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Received: November 3, 2019
Revised: December 16, 2019
Accepted: December 17, 2019

The structural and physical properties of $Cu_{90-x}Fe_xPd_{10}$ ternary alloys with $x = 5$, 10, 15, and 20 are studied using X-ray diffraction, resistivity measurements, Vickers hardness tester, and tensile testing machine. The samples were prepared by using arc-melting furnace under an atmosphere of purified Argon. The integrated intensity data obtained from X-ray diffraction are used to determine microstructure and hence lattice parameter. The lattice parameter has shown a negative deviation from Vegard's rule. The addition of Fe in $Cu_{90-x}Fe_xPd_{10}$ alloy improves the structure, and increases the electrical resistivity and the hardness of alloy. With the addition of Fe, the mechanical properties of alloy such as ultimate tensile strength, Young's modulus, and elongation are decreasing, while the elastic limit is increasing.

Keywords: Cu concentration, lattice parameter, ternary alloys, X-ray diffraction, Miller indices