

## Non-Equilibrium Synthesis and Structural Characterization of Magnetic FeCoPt Nanocrystalline Alloys

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**Abstract :** FePt-based systems are currently under scrutiny for their possible use as future materials for perpendicular magnetic recording. Another possible application is in the field of permanent magnets without rare-earths, magnets that are capable to operate at higher temperatures than the classic Nd-Fe-B magnets. Within this work, FeCoPt alloys prepared by rapid solidification from the melt are structurally and magnetically characterized. Extended transmission electron microscopy analysis shows the high degree of L10 ordering. X-ray diffraction is used to characterize the phase structure and to obtain the structural parameters of interest for L10 ordering. Co-existence of hard CoFePt and CoPt L10 phases with the soft fcc FePt phase is obtained within a refined microstructure made of alternatively disposed grains of around 5 to 20 nm in size. Magnetic measurements show increased remanence close to the parent L10 FePt phase and not so high coercivity due to the significant presence of the soft magnetic constituent phase. A Curie temperature of about 820K is reported for the FeCoPt alloy.

**Keywords :** melt-spinning, FeCoPt alloys, high-resolution electron microscopy (HREM), ordered L10 structure

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