

## SYNTHESIS AND CHARACTERIZATION OF NANOSTRUCTURED Co-Pt MAGNETIC FILMS ELECTRODEPOSITED FROM TARTRATE-STABILIZED CHLORIDE BATHS

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**Abstract:** Cobalt-platinum (Co-Pt) nanocrystalline alloy thin films were electrodeposited on brass substrates using a novel stable single bath system containing ammonium tartrate and ammonia solution as complex forming additive. The as-synthesized Co-Pt films were then subjected to various chemical, micro-structural, nano-structural and magnetic characterizations. Energy dispersive X-ray spectroscopy (EDS) analysis showed that the compositions of the electrodeposits could be controlled by adjusting the metal ions ratio in the electrolytic bath and by varying the current density. X-ray diffraction (XRD) results showed that the as-deposited films with nanocrystalline structure contained face-center cubic (fcc) CoPt<sub>3</sub> phase. Calculation of crystallite size from X-ray peak broadening showed that the crystallite sizes were in nanoscale dimension. Scanning electron microscopy (SEM) results showed formation of granules and clusters. Atomic force microscopy (AFM) and infinite focus microscopy (IFM) results showed granular surface morphology and approximately similar surface roughness value on Co<sub>43</sub>-Pt<sub>57</sub> film. Magnetic force microscopy (MFM) characterization on Co<sub>43</sub>-Pt<sub>57</sub> showed existence of correlation between magnetic force and surface topography. The saturation magnetization ( $M_s$ ) values of as-synthesized nanostructured Co-Pt thin films increased with increasing of Co content.