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Nano-scale physical properties of ion-implanted Co and Ni metal nanowires

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Metal nanowires(Co, Ni) were fabricated by using electro-plating method based on Al_2O_3 nanoporous template. The diameter of metal nanowires were ~200 nm, and the length of nanowires were ~10 μm. Chronopotentiometry method was used to fabricate metal nanowires, in which the applied bias was -1 V between working and reference electrodes for Co, Ni. The electrolyte consisted of of $NiSO_4 \cdot 6H_2O$ (270 g/L), and H_3BO_3 (40 g/L), in distilled water for Ni, and $CoSO_4 \cdot 7H_20$ (266 g/L) with H_3BO_3 (40 g/L), in distilled water for Co nanowire. The 3 MeV Cl^{2+} ions were implanted on the Co and Ni with dose of $3X10^{15}$ ions/cm^2. The surface morphology of nanowires were measured by SEM and AFM. The optical and Raman spectroscopy were measured by using laser confocal microscopy. The I-V characteristic was measured by using conducting AFM. The coercivity of nanowires was measured by using VSM.

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