Electrodeposition of nanowires under magnetic field

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Electrodeposition is well known to tune the shape of microcrystals, control their growth and their composition. Many experiments have highlighted magnetic field effects on electrochemical reactions, and high magnetic fields can modify process and properties of electrodeposited metals and polymers. Our goal is to investigate the effects of magnetic field on electrodeposition and electronucleation of nanowires. Different nanowires are electrodeposited in this case: ZnNi; NiFe alloys and Cu_2O oxide. The two main goals are to understand the quite complex phenomena that are involved and to obtain nanomaterials with different porosity, texture and morphology that induce particular properties (magnetic, catalytic, anti-corrosive …). For example, with a magnetic field (up to 1T) perpendicular to the direction of the nanowire growth, the XRD diagrams show some weak modifications of the phase composition of the deposited alloy. Such effect (which is not relevant with MHD) would be a piece of evidence for paramagnetic effect in magnetoelectrochemistry and of a great interest to understand what happens during electrocrystallization under magnetic field.