

Magnetochemistry – An Overview

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Magnetochemistry is a topic with two distinct aspects, one is the use of electrodeposition to make magnetic films, multilayers, nanowires and other structures with useful hard or soft magnetic properties, including structures such as spin valves with interesting magnetotransport behaviour. The other is the use of magnetic fields to modify the processes occurring in an electrochemical cell. This overview focusses on the second aspect. There are reports of field effects on mass transport, morphology of electrodeposits, electrode kinetics and electrochemical equilibria. The data are reviewed, and rationalised in terms of the magnitudes of the magnetic forces involved. Most, perhaps even all of the effects are traceable to the influence of magnetic fields on mass transport. Dramatic examples of the effects of magnetic field on plating rate and morphology of quasi-two-dimensional deposits will be presented, and progress in reproducing the results by various sorts of numerical simulation will be reported.

Future research directions in the area will be discussed.