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The Use of Magneto-hydrodynamic Convection for the Determination of Mercury (II) Ions in Aqueous Solutions[1] YOGENDRA M. PANTA, SHIZHI QIAN, Department of Mechanical Engineering, University of Nevada- Las Vegas, Las Vegas, NV 89154, MARCOS A. CHENEY, Department of Health Physics, University of Nevada- Las Vegas, Las Vegas, NV 89154 — We experimentally investigated the effects of magnetic fields on the anodic currents in the determination of mercury (II) ions in aqueous solutions with the linear sweep stripping voltammetry technique. In the stripping analysis, a potential difference is applied across the working and reference electrodes positioned in the working sample, then a transmitted current density through the sample results. When the electrochemical cell is placed on a permanent magnet, a magneto-hydrodynamic (MHD) convection is induced through the interaction between the current density and the magnetic field. The induced MHD convection enhances the ionic mass transport of the Hg^{2+} ions during both the deposition and stripping steps without the use of any mechanical stirrers or rotating electrodes. This leads to a larger anodic current, thus obtaining higher detection sensitivity for the determination of mercury (II) ions.

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