

Abstract Submitted
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Electrochemical vs X-ray Spectroscopic Measurements of NiFe(CN)₆ Crystals¹ BENJAMIN PEECHER, JENNIFER HAMPTON, Hope College — Pseudocapacitive materials like hexacyanoferrate have greater energy storage capabilities than standard capacitors while maintaining an ability to charge and discharge quickly. We modify the surface of an electrodeposited Ni thin film with a layer of hexacyanoferrate. Charging and discharging these modified films using cyclic voltammetry (CV) allows us to measure the electrochemically active Fe in the film. To determine how closely this resembles the full amount of Fe in the film, we measure the films' composition using particle-induced x-ray emission (PIXE). We also vary the amount of Ni deposited, both to compare the electrolysis value of charge deposited to the PIXE measurement of Ni in the film, and also to measure how varying the thickness of the Ni surface affects the presence of Fe in the film. Comparisons of the CV and PIXE measurements show agreement in Ni levels but disagreement in Fe levels. PIXE measurements of Fe in the film have positive correlation with Ni in the film. This correlation between PIXE measurements of Ni and Fe suggests that PIXE provides a reliable measure of Fe in the film. This implies that a variable proportion of total Fe in a given film is electrochemically active.

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