

COLLOQUIUM
UNIVERSITY OF PITTSBURGH
FRIDAY, FEBRUARY 1, 2008
704 THACKERAY HALL
4:00 P.M.

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COMPONENT POTENTIALS AND KIRCHHOFF GRAPHS

ABSTRACT: Understanding the production of current in the porous electrodes of fuel cells or batteries requires a thorough study of the diffusion/reaction/conduction processes inside the electrodes. This talk will focus on two concepts which help simplify the study of these processes: component potentials and Kirchhoff graphs. Using components potentials, one can pose a relatively simple but electrochemically relevant problem describing the production of current in, for example, an electrolyte wedge (3-phase corner) in a porous electrode, then show that this problem is well posed and that the current density can be found either numerically or asymptotically. The second part of the talk will focus on the use of basic results from linear algebra to construct Kirchhoff graphs to study the reaction networks which are fundamental to the electrochemistry. Kirchhoff graphs satisfy Kirchhoff's laws and allow one to study a reaction network as one might use a circuit diagram to study an electrical network.

Refreshments served at 3:30 p.m.
in the Math Dept. COMMON ROOM, Thackeray 705