with these adsorbed molecules through the use of optical reflectance spectroscopic techniques;

(2) the identification of certain underpotential deposited metals on gold as catalysts for the reduction of O_2 to OH^- in alkaline electrolytes by the overall 4-electron pathway;

(3) direct evidence that the underpotential deposition (UPD) of metals (Pb on Au) depends strongly on the surface morphology in studies of UPD on single crystal Au using LEED and Auger spectroscopic techniques together with thin-layer cell electrochemistry;

(4) the preparation of spinels which are highly effective as peroxide elimination catalysts in alkaline solutions and the characterization of the kinetics of the peroxide elimination reaction on these surfaces;

(5) the characterization of platinum and binary metal catalysts involving Pt, using high resolution electron microscopy, and the identification of platelet-type structures in some instances.

The research during the coming year is expected to continue in the same overall direction. The emphasis at CWRU will be on the question of catalyst stability as well as activity, the relation of electrode structures to polarization characteristics for various catalysts, the electrochemistry of carbon (particularly its electrochemical oxidation), and the further development of the predictive base for O_2 electrocatalysis in both alkaline and acid electrolytes.

Recent publications

1 E. Yeager, J. Zagal, B. Nikolic and R. Adzic, Optical and electrochemical studies of adsorbed transition metal complexes and their O_2 electrocatalytic properties, *Proc. Third Symp. Electrode Processes*, The Electrochemical Society, Princeton, NJ, in press, 1979.

2 E. Yeager, Oxygen electrodes for electrochemical energy storage systems, *Proc. Int. Assembly on Energy Storage*, National Academy of Sciences — Yugoslav Council of Academies, Dubrovnik, in press, 1979.

3 Diamond Shamrock/Case Western Reserve University, Oxygen electrodes for energy conversion and storage, *Annu. Rep., Contract No. EC-77-C-02-4146, 1 October 1977 to 30 September 1978*, in press.

ANALYSIS OF THE EFFECT OF ENERGY STORAGE POWER SYSTEMS ON NATIONAL TRANSPORTATION

Argonne National Lab., 9700 South Cass Avenue, Argonne, IL 60440 (U.S.A.)

The objective of this subcontract is to conduct the work of the Electrochemical Storage Panel by selecting and directing panel members to fulfill objectives and schedules of the study; to assist in adding electrochemical storage data to the National Energy Storage Data Base; to provide additional support to other study panels as needed.

Interplan Corporation, 100 North Hope Avenue, Santa Barbara, CA 93110 (U.S.A.)

The objective of this subcontract is a cost analysis study of the ESS vehicle candidates such as battery/flywheel, dual fueled hybrid, liquid hydrogen and hydride categories, and a study on the marketability of ESS vehicles.

Brookhaven National Labs., Upton, NY 11973 (U.S.A.)

The objective of this subcontract is to conduct work of the Chemical Storage Panel by selecting and directing panel members to fulfill the objectives of the Energy Storage Study; to assist in adding hydrogen storage data to the National Energy Storage Data Base; to provide additional support to other study panels as needed.

Battelle, Pacific Northwest Labs., Battelle Boulevard, Richland, WA 99352 (U.S.A.)

The objective of this subcontract is to conduct the work of the Mechanical Storage Panel by selecting and directing panel members to fulfill study objectives and schedule; to assist in adding mechanical energy storage data and to provide additional support to other panels as required.

NEW BATTERY MATERIALS

Dept. of Materials Science and Engineering, Stanford University, Stanford, CA 94305 (U.S.A.)

This program is being undertaken to explore new materials for use in advanced battery systems, and to understand and evaluate relevant structural, thermodynamic, and kinetic parameters. One of the major directions being pursued relates to the discovery and development of solid electrolytes and ion-transparent separators that might be used in lithium battery systems. Another involves work on materials that might be useful as positive electrode or negative electrode constituents in lithium-based batteries. Efforts are also being undertaken to understand better the mechanisms and kinetics of the processes occurring in the electrode materials currently being used in the