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B. Génie Électrochimique

Prof. Dr. **Philippe Javet***

1. The Main Activities of the group of Prof. *P. Javet* are

- Preparative isoelectric focusing
- Mass transfer (two-phase systems, coated electrodes)

2. The Most Important Results obtained during the last five years are:

2.1. *Preparative Isoelectric Focusing*

A preparative apparatus is developed, including a heat exchanger between compartments with isoelectric membranes. The selectivity of the isoelectric membranes was optimized as a function of isoelectric points of the separated proteins. At 2500 V and 60 W, 0.3 g of horse heart myoglobin from 0.2 g of whale skeletal muscle myoglobin could be separated in 1 h. At a total load of 2 g of protein, 97% of bovine hemoglobin (2% initial concentration) was purified from bovine serum albumin (0.15%) [1].

2.2. *Local Enhancement of Liquid-to-Wall Mass Transfer by a Single Gas Bubble*

Local liquid-to-wall mass-transfer enhancement by a single bubble was studied. Both photographic and local current measurements were taken. The effects of the bubble form, wake and trajectory were analyzed for vertical and down-facing inclined electrodes. For angles lower than 40°, bubbles rise over the surface with small hops of regular amplitude. High current increases were observed where the bubble hits the electrode. For higher angles, the bubble glides, producing high constant currents [2].

2.3. *Mass-Transfer Phenomena at* Nafion®-*Coated Electrodes*

The mass-transfer properties of *Nafion®*-coated Pt rotating disk electrodes (rde) towards ferricyanide and ferric ions were investigated. The influence of the film thickness, of the reactant concentration, and of the rotation speed were qualitatively well described by the membrane model. This model, however, did not perfectly fit the experimental results; especially, the increase of the rde rotation speed corresponded to a higher increase of the limiting current than predicted by the model. This deviation was particularly important at high rotation speeds. The presence of inhomogeneities or pinholes is proposed to explain this behavior [3].

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[3] F. Porchet, P. Javet, *Electrochim. Acta* **1995**, *40*, 2569.

Philippe Javet, of Swiss origin, was born in Paris in 1936. After his A-levels in letters in 1956, he graduated in chemical engineering in 1960 at the University of Neuchâtel where he also achieved his Ph.D. in 1966. From 1961 to 1966, he worked as a chemical engineer in the Laboratoire suisse de recherches horlogères in Neuchâtel. This work represented the substance of his thesis. From 1966 to 1968, he collaborated at the formation of a group of electrochemical engineering at the University of Pennsylvania, Philadelphia. In 1968–1969, he directed the thesis on the structure of galvanic deposition of the Ph.D.-students of Prof. *Ibl* and in 1969, he was one of the co-founders of the Institut de génie chimique (Institute of chemical engineering) at the EPFL (Federal Institute of Technology). He gave graduate courses on the phenomenon of transfer in chemical engineering as well as industrial electrochemistry. From 1970 on, he is a lecturer in technical chemistry. In 1976, he is appointed professor at the Institute of chemical engineering at the EPFL. He has been presiding over the Commission of planning and construction since 1982.

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