ELLIPSOMETRY AND ELECTROCHEMISTRY

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Measuring the growth speed of a thin layer formed during an oxidoreduction reaction has always been a difficult task. The gravimetric method can only provide a mean value when the reaction is finished or stopped, whereas the polarographic method gives a value proportional to the speed but not the speed itself [1]. Both methods allow neither to determine the instantaneous reaction speed nor to detect the composition variations of the formed layer.

Ellipsometry can solve these problems by comparing the polarization state of an incident beam and that of the beam reflected on a thin layer formed on an electrode. This leads to the complex optical index of the thin layer, linked to the composition, and its thickness, related to the reaction speed.

An ellipsometer with rotating polarizer configuration supplies quick measures and can follow *in situ* the layer growth in an electrochemical cell. The changes of the optical index and of the layer thickness are recorded versus time.

Comparing the experimental results with those extracted from a layer-growth model leads to interesting conclusions in the field of electrochemistry [2].

[1] I. OHNO, Surface technology, 13, 1 (1981).
[2] R. GREEF, Thin solid films, 233 (1993), pp 32-39.

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