

FUNDAMENTALS AND NEW APPLICATIONS OF SCANNING
ELECTROCHEMICAL MICROSCOPY

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The scanning electrochemical microscope (SECM) can be used to examine surface chemistry at interfaces in liquid environments with high sensitivity and spatial resolution. Scanning electrochemical microscopy involves the measurement of the current through an ultramicroelectrode (UME) (an electrode with a radius of the order of a few nm to 25 μm) when it is held or moved in a solution in the vicinity of a substrate. Substrates, which can be solid surfaces of different types (e.g., glass, metal, polymer, biological material) or liquids (e.g., mercury, immiscible oil), perturb the electrochemical response of the tip and this perturbation provides information about the nature and properties of the substrate and reactions at or near the surface. The basic principles of SECM and examples of its application to different systems (electrode surfaces, liquid/liquid interfaces, biological samples) will be described.

References

1. A. J. Bard and M. V. Mirkin, Eds., *Scanning Electrochemical Microscopy*, Marcel Dekker, Inc., New York, 2001.
2. Bard, A. J.; Fan, F.-R. F.; Mirkin, M. V. "Scanning Electrochemical Microscopy," in *Electroanalytical Chemistry*; A. J. Bard, Ed.; Marcel Dekker, Inc., New York, 1993; Vol. 18; pp 243–373.