Voltammetry Using Electrodes Modified with Random Arrays of Microdroplets

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The use of electrodes modified with micron sized droplets containing femtolitres of water immiscible organic liquids will be described.

First the issue of mass transport to >partially blocked= electrodes will be considered from the point of view of a macroelectrode being increasingly covered with droplets of an inert oil and thus transforming into an >array of microelectrodes=

Second the use of droplet modified electrode to generate a species at the unblocked part of the electrode which is chemically reactive on the surface of the droplets is shown to provide a sensitive and simple approach to the measurement of liquid-liquid kinetics. This is illustrated with reference to the vitamin B_{12} mediated debromination of several vicinal dibromides. A comparison of these liquid-liquid reactions with their homogeneous counterparts carried out in acetonitrile solution shows significant differences, the reasons for which will be speculated upon.

Third the case where the modifying droplets are composed of a redox active liquid is considered.