
Langmuir–Blodgett technique versatility for electrode modification and its ECL application

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Abstract

A growth of ECL analytical application is in tandem with a search of new efficient ECL reagents and techniques of ECL experiment by many scientific groups. It's chagrin that organometallic complexes, primarily ruthenium bipyridyl and its derivatives, are mainly used in aqueous system. In the work Langmuir–Blodgett (LB) film technique advantages are shown. LB technique use for electrode modification is capable to give new possibilities to ECL. This method serves nanotechnological manipulation with surface active reagents (SAR) to construct molecular ensembles on a water surface and to transfer them to solid substrates as LB film. Furthermore, this list isn't limited by "only SAR in LB film" and the different components incorporation in the main matrix is possible.

The main advantage is utilization insoluble reagents that known as well ECL reagents for aprotic mediums and using them for aqueous tests. Some works demonstrated different technics how to use insoluble components in an aqueous medium nevertheless LB technique has other features that highlight it from others. In this way, high-density films with a fine durability can be composed. A layer-by-layer transfer supports a film thickness control with a molecular level. Reproducibility of a film procedure is excellent and is guaranteed by a monitoring of tension in a film at the stage of a film aggregation on a water surface. Also, it helped by the automated manipulation of a substrate at the stage of a film transfer.

In the work 9,10-diphenyl anthracene and rubrene were used to decorate an amphiphilic polymer matrix polymethylmethacrylate (PMMA) film. ITO electrodes equipped with LB film were used in ECL experiment with tripropylamine co-reactant. Obtained ECL response satisfies expectation in looking for a new technology for ECL sensor fabrication.

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