

# Combining Aryltriazenes and Electrogenerated Acids To Create Well-Defined Aryl-Tethered Films and Patterns on Surfaces

*Jesper Vinther*

In a recent paper, we have shown that immobilization of submonolayers to 4-5 multilayers of organic molecules on carbon surfaces can be performed by *in situ* generation of aryl radicals from aryltriazenes. The central idea consists of oxidatively forming an electrogenerated acid of N,N'-diphenylhydrazine to convert the aryltriazene to the corresponding diazonium salt in the diffusion layer of the electrode. In a second step, the diazonium salt is reduced at the same electrode to give a surface of covalently attached aryl groups. In this manner, various moieties tethered to the aryl groups can be immobilized on the surface. Here a ferrocenyl group was introduced as redox marker. The electrochemical behavior of the immobilized ferrocenyl group is independent of film thickness, the latter being easily controlled by the number of repetitive cycles performed. It is also demonstrated that the new approach is suitable for patterning of surfaces using scanning electrochemical microscopy.

Furthermore, the immobilization and subsequent charging of the ferrocenyl group has been followed *in situ* using Electrochemical Quartz Crystal Microbalance, which reveals new details in the overall mechanism.