

August 16-17, 2018
Dublin, IrelandJ Org Inorg Chem 2018, Volume 4
DOI: 10.21767/2472-1123-C4-012

ELECTROSYNTHESIS AS AN INVESTIGATION TOOL

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Electrolysis is one of the classic preparative methods of organic chemistry. At the same time, substances produced by electrolysis (electro-generated species, EGS) - primary generally unstable particles and final electrolysis-products, can be used for subsequent investigations. Respectively, two options (a) without isolation and (b) with isolation of the EGS are considered. The former includes various electrochemical techniques - cyclic voltammetry, voltammetry with rotating ring-disc electrode, etc., and combined electrochemical (EC-) methods, such as EC- ESR, EC- NMR, EC- stop flow, etc. These allow to receive valuable information on the structure of the primary EGSSs, kinetics and laws of their transformations. The latter case, (b) refers to study of properties and effects of pre-electrode medium, comparing results of a usual electrolysis, i.e. heterogeneous (EHET), and

homogeneous electro-catalytic processes (EHOM). Taking this idea a step further, a method with expansion of the reaction zone from the electrode surface to the bulk of the solution by a gradual increase in the contribution of EHOM - method. Pre-electrode tomography (PELTO) is developed. First results of using the PELTO included detection of differences in the structure of the EHOM- and EHET- products, determination of the effective orientation of the substrate particle at the electrode surface, estimate of transition time to the equilibrium orientation - evaluation of the "orientation memory", "Superviscosity"-hypothesis for the pre-electrode medium, etc. Further applications of the PELTO- method are discussed.

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