



**ZAJEDNIČKI SEMINAR Hrvatskog biofizičkog društva, Hrvatskog mikroskopijskog društva i  
Instituta Ruđer Bošković**

IRB, Bijenička cesta 54, dvorana III. krila, srijeda, 4. prosinca 2019, u 12:00 sati

**Bentonite clays as (electro)catalysts and adsorbents**

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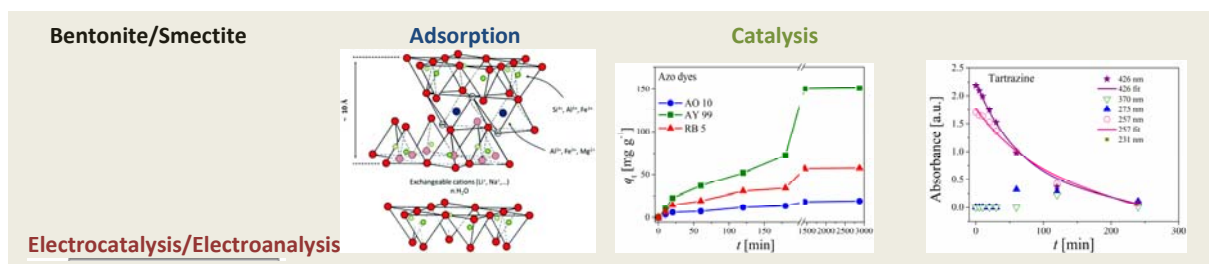
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In our previous investigations numerous of the functional materials based on bentonites were obtained. Organomodification with chitosan and quaternary alkylammonium cations, lead to obtainment of successful adsorbents for nicotine, azo dyes, their mixtures with toxic metallic cations<sup>1</sup>, as well as radioactive  $\text{TcO}_4^-$ . Pillared clays (PILC) with incorporated Al or mixture of Al with Fe, Co, Ni oxide pillars, as well as Co-impregnated Al-PILC were proven as efficient heterogenous Fenton-like catalysts for removal of azo dyes, phenol and its derivatives in the presence of either hydrogen peroxides<sup>2</sup> or Oxone<sup>®</sup><sup>3</sup>.

Organobentonites and PILCs were also tested as electrode materials. Electrodes were prepared either in the form of thin layer deposited on the glassy carbon electrode or carbon paste electrode. It was found that the type of bentonite modification and the choice of active component are the key feature that prevents electrode deactivation during electrochemical oxidation of phenol and its derivatives<sup>4</sup>. Electrodes based on bentonite modified with chitosan or poly(vinyl alcohol) were successfully applied in simultaneous detection of phenol derivatives even in the real water<sup>5</sup>. Besides mentioned applications in environmental protection, non-enzymatic bentonite based electrode was proven to be applicable in quantitative determination of glucose regardless the presence of the interfering species commonly present in human blood<sup>6</sup>.



**References**

- <sup>1</sup> N. Jović-Jovičić et al., "Synergic adsorption  $\text{Pb}^{2+}$  and reactive dye - RB5 on two series organomodified bentonites". J. Contam. Hydrol. 150:1, 2013.
- <sup>2</sup> P. Banković et al, "Mixed pillared bentonite for electrooxidation of phenol". Appl. Clay Sci. 49:84, 2010.
- <sup>3</sup> M. Marković et al., "Co(II) impregnated Al(III)-pillared montmorillonite-synthesis, characterization and catalytic properties in Oxone<sup>®</sup> activation for dye degradation". Appl. Clay Sci. 182:105276, 2019.
- <sup>4</sup> Z. Mojović et al., "Phenol determination on HDTMA-bentonite-based electrodes", J. Hazard. Mater. 194:178, 2011.
- <sup>5</sup> S. Marinović et al., "Non-toxic poly(vinyl alcohol)/clay composites as electrode material for detection of 4-chlorophenol and 4-nitrophenol". J. Electroanal. Chem. 848:113280, 2019.
- <sup>6</sup> T. Mudrinić et al., „Novel non-enzymatic glucose sensing material based on pillared clay modified with cobalt". Sensor. Actuat. B-Chem. 299:126976, 2019.

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