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PhD Thesis: **Photoactive hybrid nanomaterials derived from layered minerals**

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ABSTRACT

The goal of the dissertation was to synthesize and characterize photoactive materials based on layered minerals and explain the processes and interactions occurring within their structure. Azobenzenes (Az) are molecules which exhibit trans–cis isomerization under UV and Vis light. Photoactive materials can be prepared through intercalation of Az into the layered crystalline phase, where the UV–induced isomerization influences the properties of the organo–mineral complex. The Az isomerization was previously observed for selected clay minerals, i.a. mica and montmorillonite, and in some cases it led to the basal spacing shifts. This work enhances the number of host–guest combinations: two smectites (montmorillonite and beidellite), kaolinite and a synthetic α–zirconium phosphate were modified with azobenzenes. The performed modifications allowed the intercalation of Az into the interlayer space of the minerals. Azobenzene isomerized freely and reversibly under the UV/Vis irradiation. Efficient isomerization was pronounced for samples with low packing density of the molecules. The basal spacing shifts were particularly visible for beidellite, which was due to the presence of low layer charge. The careful selection of the host material, guest compound and modification procedure leads to the synthesis of a photoactive material with desired properties.