

## Functionalization of textile materials with bioactive layered silicate

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### Abstract

The aim of the study was to develop modified layered silicate with bioactive particles, and then its application to the textile materials. As bioactive particles the compounds of copper ( $\text{CuSO}_4$  or  $\text{Cu}_2\text{O}$ ) were used. The modification of layered silicate was carried out by ion exchange in a two-step process. Changes in the structure of modified layered silicate were characterized using wide-angle X-ray scattering (WAXS) and Fourier transform infrared spectroscopy (FTIR). The increase of 0.3 –5.2 Å in the interlayer distance of modified silicate was observed. This increase in the interlayer spacing indicates the intercalation of using bioactive particles into the structure of layered silicate. This intercalation occurs mainly by ion exchange, what was confirmed by elemental analysis (sodium, calcium and copper) layered silicate before and after modification carried out using energy-dispersive X-ray spectroscopy (EDX).

The modified layered silicate was deposited on the polyester woven fabric by the padding method. After deposition of layered silicate containing copper on the surface of fabric, the textile material was subjected to test of bioactive properties by quantitative method. In depend on the type of functional particles used, the polyester woven fabric was characterized by bacteriostatic or bactericidal properties.

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