# Metal-organic framework/magnetite composites for electronic devices

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This study is devoted to the development of new composite materials, consisting of framework organometallic compound with magnetite nanoparticles, with potential application for cooling electronic devices using the approach described in [1].

Basolite A520 (aluminum fumarate) was synthesized according to [2]. It has a high specific surface area (1040 $m^2/g$), good water absorption (about 426 mg/g), a hydrodynamic particle diameter of about 340 nm and a ζ-potential of +20 mV. Two types of Basolite A520-based composites with a mass fraction of magnetite of about 7 % were obtained. The microparticles of the metal-organic framework coated with a $(polymer/magnetite)_6$ shell were obtained by layer-by-layer assembly [3]. The $Fe_3O_4$/BasoliteA520 composite in which magnetite nanoparticles are surrounded by a matrix of porous material was obtained by admixing them to one of reagents at the early stages of the synthesis. Microphotography of Basolite A520/PSS/$(PEI/Fe_3O_4)_6$ composite shows that the particles have an irregular shape and size from 0.5 to 2.5 microns. Small particles of magnetite are clearly visible on their surface. The FTIR_spectra of the samples have bands characteristic of Basolite A520 and magnetite. Both composites have pronounced magnetic properties.

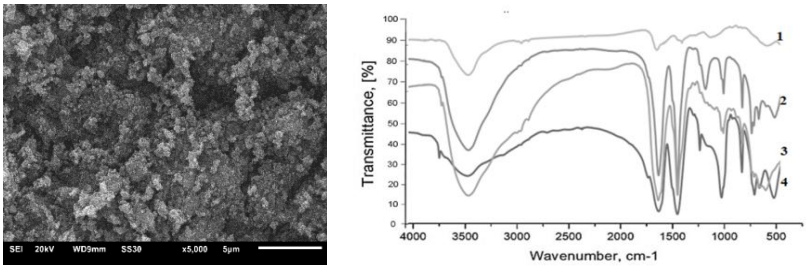


Fig. SEM microphotography of particles Basolite A520/PSS/$(PEI/Fe_3O_4)_6$ (a); FTIR spectra: 1 - $Fe_3O_4$, 2 - Basolite A520, 3 – Basolite A520/PSS/$(PEI/Fe_3O_4)_6$, 4 – $Fe_3O_4$/Basolite A520 (b) .

**References**

[1] C. Wang et al. Joule (2020) 4: 2.
[2] US patent 2012/0082864 A1.
[3] T.G. Shutava et al. Colloids Surf. A. (2018) 539.