Abstract for general public

Examination of iongels doped with organic dyes as new, potential thermochromic markers

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Thermochromic materials (from the Greek thermos, meaning temperature and chromos, meaning color) are characterized by a change in optical properties (e.g. color) depending on the applied temperature. There are materials that change color under the influence of low and high temperatures. They can be classified into 3 different groups: organic, inorganic and hybrid.

The materials used in the project, "*Examination of iongels doped with organic dyes as new, potential thermochromic markers*" are modern, designed organic-inorganic hybrids with irreversible color change. In the case of this project, iongels are based on a parent network (matrix) - silica impregnated with an ionic liquid and an organic dye. The parent network is responsible for the final form of the material, which allows the indicator to be placed on the microscope slide; the ionic liquid dictates the possible temperature at which the change in the material is observed; the organic dye is responsible for the marker color. So far, Ionogels have been used in many areas of life, such as: components of lithium-ion batteries or insulators. It is also possible to use these materials in the future in the so-called smart windows (glass that changes color / darkens under the influence of heat from sunlight).

The project assumes that it is possible to synthesize such a hybrid material that will use the advantages of each of its components to obtain an irreversible thermochromic index, which may be used in the future in superheat sensors. It is believed that the properties of the final material will depend on the type of ionic liquid used and its concentration. So far, no attempts have been made to investigate the relationship between the structure of the ionic liquid and the properties of the silica-based iongel. An additional interesting aspect seems to be the changes in the color of the organic dye depending on the temperature used. The project also aims to present possible structural relationships in hybrid materials before and after the annealing process using spectroscopic methods. Preliminary studies have shown that a slight change in the structure of the ionic liquid may result in changes in the material at different temperatures (Figure 1).

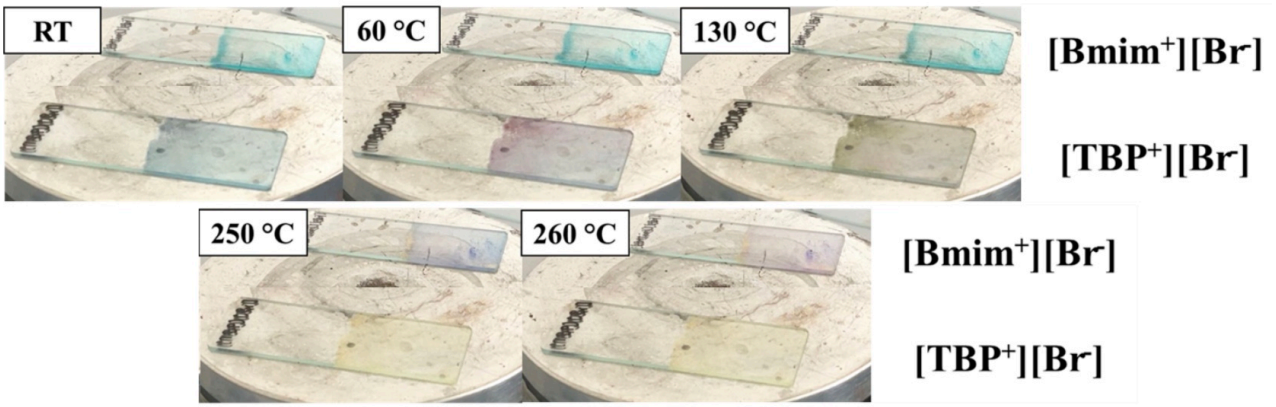

Figure 1. Photographs recorded at different temperatures for iongels based on different ionic liquids and the same dye.