APPLICATION OF IMIDAZOLIUM-BASED IONIC LIQUIDS IN CHEMISTRY OF LIGNIN

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One of the main tasks of modern chemistry is to change traditional processes to environmentally-safe ones, particularly using environmentally-safe solvents. There are strict requirements of the organic solvents in "Green" Chemistry: incombustibility, non-toxicity, low flammability and volatility within the acceptable viscosity, and safety of an environment.

Such properties obtain ionic liquids (IL). Ionic liquids are an organic salts in molten state under room temperature. Ability of the low-temperature melts of salts to stay liquid in a broad temperature range is an important ionic liquids' property, especially if they are used as solvents. Numerous works, studying ionic liquids as cellulose' and other natural polymers' solvents have been published during the last years. Being volatile and toxic, classical organic solvents used in lignin's chemistry, such as dioxane, DMSO, DMFA and pyridine do not meet the requirements of "Green" chemistry. Changing traditional solvents to the safe ones is the most urgent task that needs fundamental scientific search.

Ionic liquid [BMIM][CH_3COO] is being studied, as it dissolves one of the main wood's polymeric component – lignin (under room temperature the solubility is 13g per 100g of solution). At the same time, the cellulose dissolves neither under room temperature nor under heating. High dissolubility of lignin in the ionic liquid may be useful for extracting lignin out of the cellulose-containing materials for obtaining lignin and purifying the materials themselves. Thus, [BMIM][CH_3COO] may replace traditional solvents in lignin's chemistry.

Dependence of the temperature and refractive index (n_D), density (d), absolute viscosity (η) were studied (the range was 298-328 K).

It was shown, that temperature growth makes η of [BMIM][CH_3COO] reduce significantly. Refractive index decreases linearly within the same temperature range. Temperature coefficient of the refractive index remains permanent (0,0002 degree^{-1}). Interdependency of d and n_D is directly proportional (as for the most liquids).

Temperature dependence of viscosity of spruce lignin's solutions in [BMIM][CH_3COO] and DMSO was defined.