

# Nanocomposites and nanomaterials

## Development of thermostable nanoporous polymer films using ionic liquids

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Porous polymeric materials have a large variety of applications in many areas, as highly efficient membranes, porous substrates, selective adsorbents and filters, porous electrodes for fuel cells, sensors or insulators etc. Recently we used different approaches for development of nano- and macroporous structure in thermostable cyanate ester resins (CERs) [1-2].

Novel thermostable nanoporous film materials of CERs generated by polycyclotrimerization of dicyanate ester of bisphenol E *in situ* with 1-heptylpyridinium tetrafluoroborate ([HPyr][BF<sub>4</sub>]) followed by extraction of [HPyr][BF<sub>4</sub>] have been developed and characterized. The scanning electron microscopy and DSC-based thermoporometry confirmed the formation of nanoporous structure in the CER samples synthesized. The pore size distribution varied from ~20 to ~180 nm with an average pore diameter of around 45 and 60 nm depending on the initial porogen content in CERs studied.

1. Fainleib A., Gusakova K., Grigoryeva O., Starostenko O., Grande D. Synthesis, morphology, and thermal stability of nanoporous cyanate ester resins obtained upon controlled monomer conversion // Eur. Polym. J.-2015.-**73**.-P. 94-104.

2. Grande D., Grigoryeva O., Fainleib A., Gusakova K. Novel mesoporous high-performance films derived from polycyanurate networks containing high-boiling temperature liquids // Eur. Polym. J.-2013.-**49**.-P.2162-2171.