Hamburg University of Technology (TUHH)
Institute of Thermal Separation Processes -V8-
Eissendorfer Str. 38, DE-21073 Hamburg

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Abstract Formulary

Presentation type: **Oral** ✔ **Poster** ☐

Title: Towards Fabrication of Novel PI Aerogels with Superior Moisture Resistance and Flexibility

Authors: Shahriar Ghaffari-Mosanenzadeh, Omid Aghababaei Tafreshi, Nicholas X. Fang,Hani E. Naguib

Presenting author: Shahriar Ghaffari-Mosanenzadeh, Omid Aghababaei Tafreshi

Institution (Presenter): University of Toronto, Department of Mechanical and Industrial Engineering

ABSTRACT (Space limited to 2200 characters)

In the last decade, polyimide (PI) aerogels have been synthesized via the step-growth polymerization of monomers, followed by the cross-linking of the formed polymer chains using a chemical crosslinker. This method was widely explored and various PI aerogels for thermal insulation, filtration, and energy storage were successfully developed. Nevertheless, the employed chemical crosslinkers are costly, commercially unavailable, and have detrimental environmental impacts. Furthermore, chemically crosslinked PI aerogels typically suffer from hydrophilicity and low mechanical flexibility which hinder their widespread application in practical fields. In this study, a novel synthesis approach is introduced in the fabrication of physically crosslinked polyimide (PCPI) aerogels using no chemical crosslinker. The fabricated aerogels showed outstanding moisture resistance, excellent hydrophobicity as well as remarkable mechanical flexibility. With respect to the shortcomings of chemical crosslinkers, the proposed approach is this study can pave the way toward the fabrication of cost-effective and environmentally friendly organic aerogels with outstanding performance for potential application in aeronautics, space exploration, thermal insulation, energy harvesting, flexible electronics, and solar devices.