**FOAMING WHAT CAN`T BE FOAMED: MACROPOROUS POLYIMIDES**

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C:\Users\DanteMD\AppData\Local\Microsoft\Windows\INetCache\Content.Word\gamma-20-20180111.000005.tifPolyetherimide (PEI) and thermoplastic polyimide (TPI) are amorphous thermoplastic polymers with an aromatic ring in the main backbone, which possess interesting properties, such as high chemical resistance, great mechanical properties, high glass transition temperature and excellent dimensional stability. [1]. Furthermore, polyImides foams are of interest. However, currently the main method for producing porous polyImides is still staying gas blowing or salt/porogens leaching, TPI foam are still not available. Thermally induced phase separation (TIPS) [2] could be used to produce porous high performance polymers.

Here we report the production of macroporous PEI and TPI by a modified TIPS process in high boiling point solvents. Our process involves the dissolution of PEI or TPU in a high boiling point.

We will demonstrate that the morphology of resulting high performance macroporous polymers can be tailored by varying the temperature profile during cooling and choosing of the solvent. It is even possible to create PEI and TPI foams with a tailored pore structure (Fig. 1). We will show that PEI foams have mechanical properties on par with commercially available PEI foams. Furthermore, we show that never foamed TPI can indeed be foamed and this TPI foams have outstanding thermomechanical and chemical properties.

Fig 1. SEM image of 80% porosity PEI morphology

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