# Large-scale production and organo-functionalisation of boron nitride nanosheets and their characterisation

**Freskida Goni**
Angela Chemelli, Frank Uhlig
*Institute for Inorganic Chemistry, Graz University of Technology, Stremayrgasse 9, 8010 Graz, Austria*
freskida.goni@tugraz.at

Boron nitride nanosheets (BNNSs) have gained great attention as an interesting filler medium in the production of electrically insulating and thermally conductive polymer-based composite materials. Their wide band gap and high thermal conductivity make BNNSs a superior candidate for this application. However, one of the greatest barricades to the further production and investigation of these polymers is the lack of cost-effective methods for fabricating high yields of BNNSs. Furthermore, using these nanosheets as fillers can be challenging due to their high tendency to agglomerate. The production of boron nitride nanosheets by using the liquid phase exfoliation method (LPE) was investigated and ways to increase the yield and upscale the production are demonstrated. Moreover, the BNNSs were functionalised with organo-silanes, so that the modified nanosheets can bond covalently to the polymer matrix, leading to the prevention of agglomeration and an increased thermal conductivity of the polymer. The boron nitride nanosheets were characterised by dynamic light scattering (DLS), small angle X-ray scattering (SAXS), atomic force microscopy (AFM), infrared spectroscopy (IR) and ultraviolet-visible spectroscopy (UV-VIS).