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Organo functionalization of boron nitride nanosheets and their characterization

Different fillers are used in order to improve the thermal conductivity of polymers. Boron nitride nanosheets are an ideal candidate for this kind of application, due to their appealing properties. These nanosheets have a band gap of 5.955 eV [1], which makes this material an electrical insulator, but with a very high thermal conductivity. However, one of the challenges of using these as fillers is their dispersion in the polymer matrix, because of the high tendency of the nanosheets to aggregate. In order to improve this, the idea was to functionalize the boron nitride nanosheets with organo silanes (Figure 1), so that the modified nanosheets can bond covalently to the polymer matrix, leading to the prevention of aggregation and an increased thermal conductivity of the polymer. Silanes such as (3-aminopropyl)dimethylmethoxysilane as shown in Figure 1, as well as (3-aminopropyl)trimethoxysilane and (3-aminopropyl)diethoxymethylsilane were used to functionalize the boron nitride nanosheets. The modified nanosheets were characterized by dynamic light scattering (DLS), small angle x-ray scattering (SAXS), infrared spectroscopy (IR), ultraviolet-visible spectroscopy (UV-VIS), scanning electron microscopy (SEM) and nuclear magnetic resonance (NMR).

References

[1] Cassabois, G.; Valvin, P.; Gil, B.; *Nature Photonics*, **2016**, 10(4), 262-266.

Figures

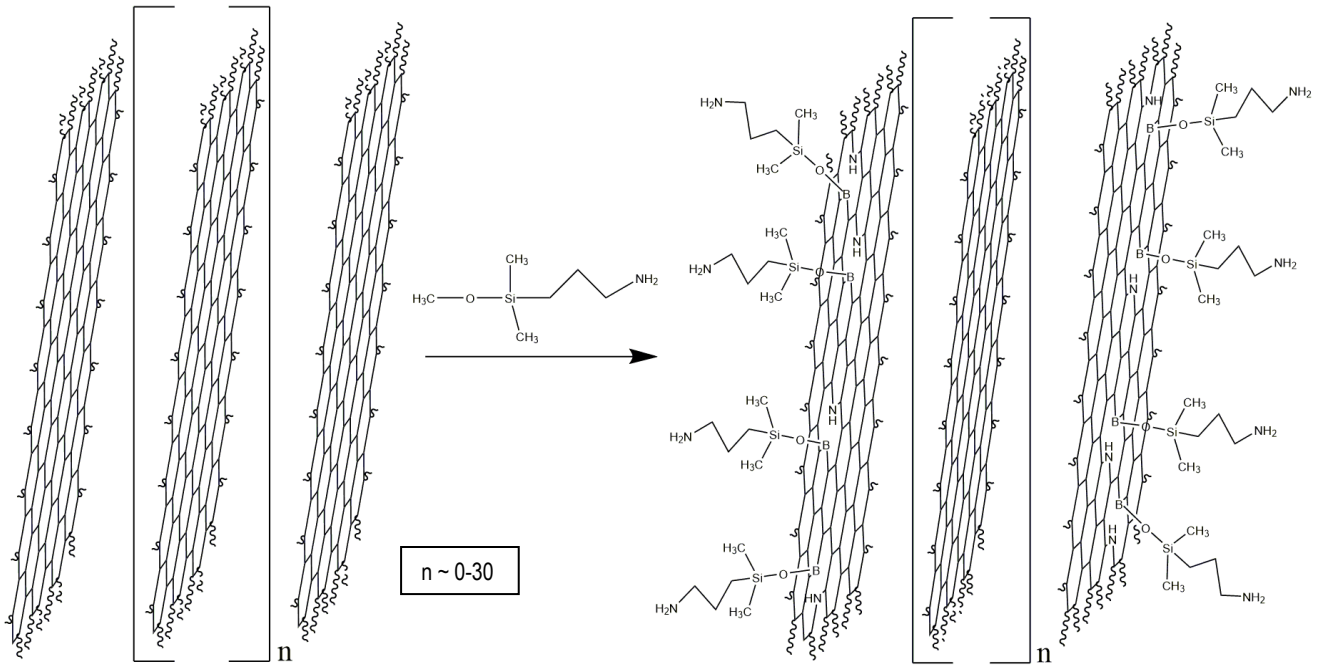

Figure 1: Functionalization of boron nitride nanosheets