Synthesis and characterization of 2D Butyl-GeH

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Two-dimensional van der Waals materials have shown great promise for a variety of electronic, optoelectronic, sensing and energy conversion applications. Since almost every atom in these two-dimensional crystals is exposed to the surface, covalent surface termination could provide a powerful method for the controlled tuning of material properties. Here, we demonstrate a facile, one-step synthesis approach that directly converts GeH crystals into mm-sized crystals of butyl-terminated germanane (GeC_4H_9). The product was characterized by a combination of experimental techniques including X-ray diffraction, FTIR, UV-Vis and XPS spectroscopies as well as atomic force microscopy (AFM) in order to verify its structure and composition.

References

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Figures

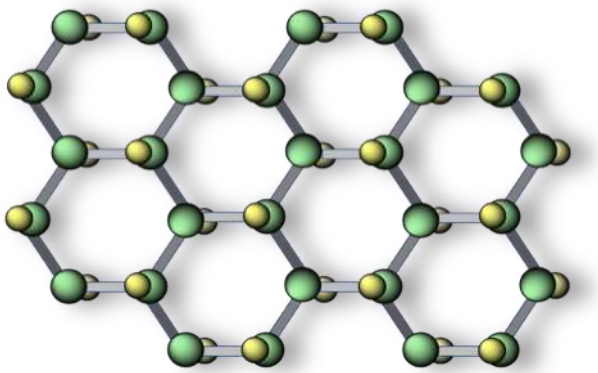

Figure 1: Illustration of a single layer germanane (GeH), Ge atoms (green) and H atoms (yellow)

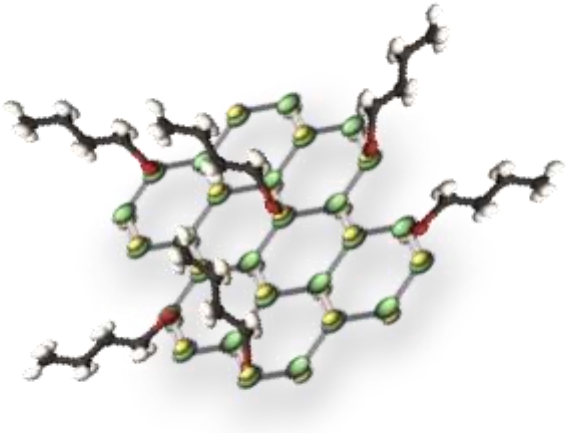

Figure 2: Functionalization of a single layer germanane with the n-butyllithium monomers