

# SYNTHESIS OF THE POTENTIAL SOLID STATE ION CONDUCTORS CONTAINING WEAKLY COORDINATING ANIONS.

Wiktorija Dołębska<sup>1</sup>, Tomasz Jaroń<sup>2</sup>

<sup>1</sup>Department of Physics, University of Warsaw, Poland

<sup>2</sup>Centre of New Technologies, University of Warsaw, Poland  
[w.dolebska@cent.uw.edu.pl](mailto:w.dolebska@cent.uw.edu.pl)

In the project we are exploring new materials that could be used as potential energy storage materials. We target magnesium salts with weakly-coordinating anions (WCA):  $\text{Al}[\text{OC}(\text{CF}_3)_3]_4^-$ ,  $\text{B}_{12}\text{H}_{12}^{2-}$  and  $\text{B}_{12}\text{F}_{12}^{2-}$ . Due to weak attraction forces between relatively small cation and big WCAs such salts could be potential solid state ion conductors. They could replace currently used electrolytes in electrochemical energy storage devices - they would have better capacity thanks to magnesium charge and as solids they would also be more stable. So far we obtained some new structures of solvated salts (as shown in Fig.1) and we are working on crystallization procedures in order to obtain solvent-free salts.

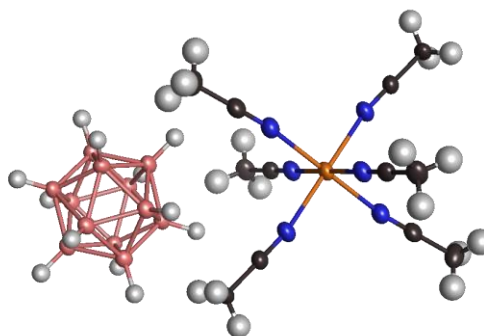


Fig. 1. One of the synthesized salts –  $\text{Mg}(\text{ANC})_6\text{B}_{12}\text{H}_{12}$ .

To characterize our compounds we usually use X-ray diffraction (powder and monocrystal), FTIR spectroscopy and TGA analysis. In the nearest future we also want to perform electrochemical measurements and examine conductivity of obtained compounds. Moreover, such salts are soluble in weakly-solvating solvents. Thus want to use them as substrates in ion-exchange reactions in these solvents targeting new hydrogen-rich compounds (e.g mixed-metal borohydrides) that could be potential hydrogen storage materials. [1]

---

[1] T. Jaroń, P. A. Orłowski, W. Wegner, K. J. Fijałkowski, P. J. Leszczyński, W. Grochala, *Angew. Chem. Int. Ed.*, 54 (2015) 1236–1239.