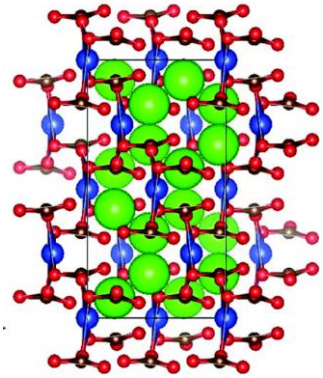
Titre de la thèse	MOLECULAR (MULTI)FERROICS BASED ON COPPER CARBONATES
Descriptif du sujet **(10 lignes maximum)**  *The structure of KCCO viewed along the b crystal axis.*	Magneto-electric multiferroics, possessing both a spontaneous polarization and magnetization are extremely rich materials[1]. Potassium cupricarbonate (KCCO) is a serious candidate to belong to his family [2] and preliminary results from our team show that replacing the K^+ by an organic cation significantly improve the magnetic properties. Since, such organic cations often contribute to ferroelectric behavior due to their intrinsic polarity and disorder-order transitions, the project targets the elaboration of new cupricarbonates with organic cations such as guanidinium, formamidinium, imidizolium or alkyl or aryl ammonium to compare with an in-depth study of the ferroic behavior of KCCO. These materials will be synthesized using bench chemistry and sintered using Cool-Spark Plasma Sintering [2]. The ceramics will be characterized by powder X-ray diffraction and scanning electron microscopy, magnetic and magneto-electric measurements. 1. Spaldin, N.A. Multiferroics beyond Electric-Field Control of Magnetism. *Proc. Roy. Soc. A:* **2020**, *476*, 20190542, doi:10.1098/rspa.2019.0542. 2. Beauvoir, T.H. de; Sangregorio, A.; Cornu, I.; Josse, M. Synthesis, Sintering by Cool-SPS and Characterization of $A_2Cu(CO_3)_2$ (A = K, Na): Evidence for Multiferroic and Magnetoelectric Cupricarbonates. *Dalton Trans.* **2020**, *49*, 7820–7828, doi:10.1039/D0DT00814A.
Compétences souhaitées **(nom du DEA, ou MASTER, etc…)**	Master or Engineer in Physical Chemistry or Materials Good level (at least B2) of French or English
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