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UNIVERSITÄT LEIPZIG

Fakultät für Chemie und Mineralogie
Institut für Anorganische Chemie

Einladung zum Kolloquium

Am Mittwoch, dem 29. Mai 2019, 16:00 Uhr spricht

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zum Thema:

Organic and Organic-Inorganic Hybrid Ferroelectric Materials Supported by Amino-phosphorus(V) Scaffolds

Materials exhibiting ferroelectric and piezoelectric properties are of immense attention due to their promising technology applications. Numerous new age materials like polymers, organic-inorganic hybrids and small molecules have been explored for this purpose to overcome certain limitations associated with ceramic materials. We have been interested in employing tetra-substituted organo- and amino-phosphorus(V) scaffolds for designing organic and organic-inorganic hybrid assemblies with ferroelectric properties. Employing axially symmetric pyridyl-functionalized dipodal amino-phosphorus(V) ligands, we were able to obtain a family of polar-ordered metal-organic assemblies in 1D-helical, 2D-layered and discrete architectures.[1,2] Utilizing pyridyl-functionalized tripodal phosphoramides, hierarchical assemblies of frameworks built on octahedral M_6L_8 type cages were obtained that showed ferroelectric anisotropic behaviour.[3] In another approach, we are interested in salts of phosphonium and ammonium cations for halo, oxo and and halogenometallate derived anions as simple ferroelectric materials and use them for the fabrication of mechanical generators. We have recently shown that the hexafluorophosphate salt of diphenyl diisopropyl phosphonium cation is ferroelectric with a remnant polarization of 6 μCcm^{-2}. Interestingly, its various weight percentages composites with poly(dimethyl)siloxane (PDMS) were shown to act as mechanical energy harvesting devices. A maximum output voltage of 8.5 V and output current of 0.5 µA was obtained for its 10 weight % device.[4] Currently, various polymer composite devices based on ferroelectric hybrid organic-inorganic systems are under investigation for mechanical energy harvesting applications.

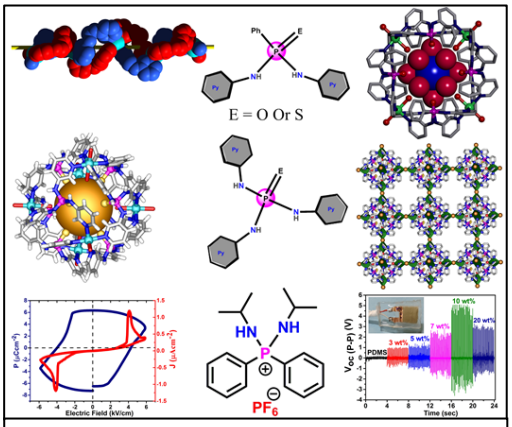

Figure 1: Some pertinent metal-organic ferroelectric assemblies from phosphorus(V) supported ligands (top and middle rows) and a ferroelectric phosphonium salt showing mechanical generator properties (bottom row)

1. A. K. Srivastava, B. Praveenkumar, I. K. Mahawar, P. Divya, S. Shalini, R. Boomishankar, *Chem. Mater.* **2014**, *26*, 3811.
2. A. K. Srivastava, P. Divya, B. Praveenkumar, R. Boomishankar, *Chem. Mater.* **2015**, *27*, 5222.
3. A. Yadav, P. Kulkarni, B. Praveenkumar, A. Steiner, R. Boomishankar, *Chem. Eur. J.* **2018**, *24,* 14639-14643.
4. T. Vijayakanth, A. K. Srivastava, F. Ram, P. Kulkarni, K. Shanmuganathan, B. Praveenkumar, R. Boomishankar, *Angew. Chem. Int. Ed.* **2018**, *57*, 9054-9058.

Ort: Fakultät für Chemie und Mineralogie, Johannisallee 29, kl. HS 015, 04103 Leipzig

Alle Interessenten sind zu diesem Vortrag herzlich eingeladen.

Die Professoren des Institutes
für Anorganische Chemie

Nähere Informationen bei Frau Prof. Dr. Dr. h.c. mult. Evamarie Hey-Hawkins, Tel.: 36151