Oral presentation

Discovering new materials and properties with the help of s/p-hole interactions

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Gaining precise control over the structure and dynamics of matter is still an open challenge, which can give access to architectures of ever-increasing complexity and, hence, to new functional materials with desired physicochemical properties.

σ/π-hole interactions have garnered significant attention in contemporary research across various domains of supramolecular science and crystal engineering. Each year, a growing number of researches explore the utilization of σ/π-phole interactions in materials science.

In this context, our focus is on outlining some intriguing examples in σ/π-phole bonded functional materials, constructed based on the foundational principles of crystal engineering. Specifically, applications in the field of porous materials, gels and structural stabilization of reactive species (Fig.1) will be discussed [1-3].

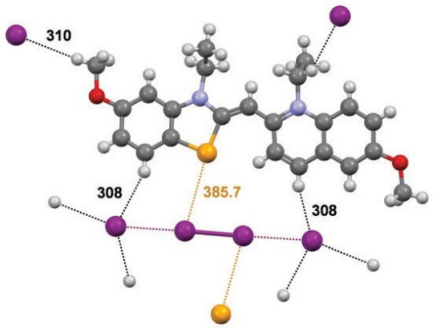

Figure 1. Cyanine dyes: synergistic action of hydrogen, halogen and chalcogen bonds allows discrete I_4^{-2} anions in crystals

[1] Daolio, A., Wiedwilt, E. K., Pizzi, A., Genoni, A., Resnati, G. & Terraneo, G., (2022) *Phys. Chem. Chem. Phys*., **24**,24892. 3554.

[2] Konidaris, K., Daolio, A., Pizzi, A., Scilabra, P., Terraneo, G., Quici, S., G., Murry, J. C., Politzer, P., & Resnati, G. (2022) *Cryst.Growth.Des.*, **22**, 4987.

[3] Daolio, A., Pizzi, A., Nayak., S. K., Pilati, T., Terraneo, G., Metrangolo, P., Resnati., G., (2023) *Chemistry Asian. J.*, **18**, e202300520