

Advances in Organic Materials: A Symposium in Honor of Fred Wudl's 70th Birthday

Balancing chemical activity and electrostatics in the molecular solid state

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Two case studies will serve to discuss issues related to the modulation of the electrostatic potential of the environment, the incommensurate number and the physics of migrating holes in conducting molecular systems. One system is β -(EDT-TTF-I₂)₂^{(1+x)+}[HO₂C-CH=CH-CO₂⁻]_(1-x)[⁻O₂C-CH=CH-CO₂]_x, a metallic radical cation salt of the nominal, mono-deprotonated π -conjugated dicarboxylate anion of fumaric acid with a metal-insulator transition at ca. 70 K where a fraction of the fumarates are deprotonated to their dianion forms. Another system is EDT-TTF-CO-NH-CH₂-CO₂H, and the 1:1 adduct, [(EDT-TTF)⁺⁺-CO-NH-CH₂-(CO₂)][[(EDT-TTF)-CO-NH-CH₂-(CO₂H)]·CH₃OH], a new type of hydrogen-bonded, one acid-to-one zwitterion hybrid embrace of redox peptidics into a two-dimensional architecture, an example of a system deliberately fashioned such that oxidation of π -conjugated cores towards their radical cation form would interfere with the activity of their appended ionizable residues in the presence of a templating base during crystal growth.