

## Family of Organic Layered Salts based on BEDT-TTF with the $[\text{OsNOCl}_5]^{2-}$ Anion

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Four new BEDT-TTF radical cation salts with the  $[\text{OsNOCl}_5]^{2-}$  anion have been synthesized:  $\alpha'$ -(BEDT-TTF)<sub>4</sub>[OsNOCl<sub>5</sub>]NB (**1**),  $\delta$ -(BEDT-TTF)<sub>4</sub>[OsNOCl<sub>5</sub>]<sub>1.33</sub>NB<sub>0.67</sub> (**2**),  $\kappa$ -(BEDT-TTF)<sub>4</sub>[OsNOCl<sub>5</sub>]BN (**3**) and  $\beta$ -(BEDT-TTF)<sub>2</sub>[OsNOCl<sub>5</sub>] (**4**) [1]. The salts were characterized by single crystal X-ray diffraction, electrical resistance measurements, and electronic band structure calculations. Evidence for commensurate structural modulations was found for **2** and **3**. The crystals of **1**, **3** and **4** are semiconductors while those of **2** exhibit a M-I transition around 160 K. Analysis of the correlation between the crystal structure, transport properties and electronic structure of this and related salts suggests the possibility of smoothly changing the conductivity of  $\kappa$ -phases with two donors and two dimers from semiconducting to metallic as well as the need to reconsider the origin of the metal-to-insulator transitions of  $\delta$ -type salts.

[1] Simonov S.V., Shevyakova I.Yu., Zorina L.V., Khasanov S.S., Buravov L.I., Emel'yanov V.A., Canadell E., Shibaeva R.P., Yagubskii E.B., *J. Mater. Chem.*, in press.

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