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3D semiconducting hybrid perovskites with aziridinium cation

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The study of hybrid organic-inorganic perovskites has rapidly emerged as one of the fastest-growing research areas in materials science over the past decade. Our study shows that aziridinium cation (AzrH) is able to support 3D perovskite structure of (ArzH)PbHal3 (Hal = Cl, Br, I). Highly reactive species of aziridinium was stabilized in 3D lead halide frameworks and was found to be a small enough organic cation to promote the formation of semiconducting organo-inorganic materials. Bandgaps of 2.99 eV (Cl), 2.27 eV (Br) and 1.52 eV (I) were determined from Tauc plots.[1] Moreover, we have managed to obtain new 3D lead-free tin-based hybrid perovskites with aziridinium cation (AzrH)SnHal3 (where Hal = Cl, Br or I) which were also found to be semiconductors with narrow optical bandgaps.[2] As well, the possibility to fine-tune the bandgap of obtained perovskites through mixing halogen or Sn/Pb sites was investigated.

Additionally, by employing the antisolvent precipitation technique and stabilization with a cationic surfactant we succeeded in obtaining quantum dots of (ArzH)PbBr3 with average size 8.6 nm that display green (520 nm) luminescence.[3] Spin-coating was used to deposit aziridinium perovskite thin films.

Thus, the discovered compounds form a new group of 3D semiconducting perovskites that can widen the range of suitable materials for solar cells and light-emitting diodes production.

1. Petrosova, H. R. et al. Chem. Commun. 2022, 58, 5745–5748.
2. Kucheriv, O. I. et al. Inorg. Chem. Front. 2023, 10, 6953-6963
3. Semenikhin, O. A. et al. Chem. Commun. 2023, 59, 3566–3569.

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