Chiral 2D organic–inorganic hybrid perovskites based on L-histidine

Autorzy

Valerii Y. Sirenko

Olesia I. Kucheriv

Elżbieta Gumienna-Kontecka

Sergiu Shova

Il'ya A. Gural'skiy

Rok wydania

2022

Czasopismo

Dalton Transactions

Numer woluminu

51

Strony

16536-16544

DOI

10.1039/d2dt03025j

Kolekcja

Naukowa

Język

Angielski

Typ publikacji

Artykuł

Streszczenie

Novel chiral hybrid perovskites are highly demanded for various advanced applications such as spintronics, optoelectronics, photovoltaics *etc*. However, the scope of these new materials is still limited. Herein, we present new 2D hybrid perovskites based upon chiral α-amino acid L-histidine. The generalized formula of these new compounds can be denoted as (L-HisH)$_2$PbBr$_x$I$_{4-x}$ (where L-His = L-histidine; x = 4, 3, 2, 1, 0.4 and 0). All perovskites are characterized by a very similar structural motif that consists of corner-sharing lead halide octahedra arranged in one-layer thin inorganic slabs interleaved by organic layers established by L-histidinium(1+) cations. L-Histidine provides a breaking of spatial parity of these perovskites that results in their non-centrosymmetric crystal structures. These compounds show a multiband absorption up to 590 nm for iodide perovskite. In addition, new compounds display pronounced single-peak photoluminescence, which finely blue shifts upon the gradual substitution of iodine by bromine. New perovskites exhibit excellent thermal stability up to 490 K and 445 K for bromide and iodide compounds, respectively. These results show the ability of L-histidine to produce novel and highly demanded chiral hybrid perovskites.

Adres publiczny

http://dx.doi.org/10.1039/d2dt03025j

Strona internetowa wydawcy

https://www.rsc.org/