

## A multiaxial electrical switching in a one-dimensional organic–inorganic (pyrrolidinium)<sub>2</sub>Cd<sub>2</sub>I<sub>6</sub> ferroelectric and photoluminescent crystal.

### Autorzy

Magdalena Rok  
Bartosz Zarychta  
Andrzej Bil  
Joanna Trojan-Piegza  
Wojciech Medycki  
Andrzej Miniewicz  
Anna Piecha-Bisiorek  
Agnieszka Ciżman  
Ryszard Jakubas

### Rok wydania

2021

### Czasopismo

Journal of Materials  
Chemistry C

### Numer woluminu

9

### Strony

7665-7676

### DOI

10.1039/d1tc01526e

### Kolekcja

Naukowa

### Język

Angielski

### Streszczenie

Ferroelectric materials exhibiting more than one polar phase are very attractive in terms of application. The advantage of such materials is temperature-dependent switching between two different ferroelectric states. Here we report on the discovery of a unique, continuous ferroelectric – ferroelectric transformation in (C<sub>4</sub>H<sub>10</sub>N)<sub>2</sub>[Cd<sub>2</sub>I<sub>6</sub>], **PCdI** at 220 K. Thermal measurements suggest that phase transition is close to the continuous one. Both phases belong to the same polar monoclinic Cc space group. Temperature-variable X-ray diffraction measurements of single crystals confirm the polar nature of the two phases (I and II). The anionic network is in the form of [Cd<sub>2</sub>I<sub>6</sub>]<sup>2-</sup> 1D chains, with pyrrolidinium cations planted between them. To our knowledge, there are few examples of a structure with chains formed by tetrahedral units. Electrical and dielectric properties were measured for the samples in crystalline and thin-layer film forms. The ferroelectric properties of phases I and II were confirmed by the reversible pyroelectric effect as well as by the polarisation–electric field (P–E) loop tests, and these results were supported by DFT calculations. Strong nonlinear optical properties (NLO) were confirmed by SHG measurements. Additionally, the photoluminescent properties were investigated with the temperature dependence of the spectra of both photoluminescence excitation (PLE) and emission (PL). The broadband luminescence revealed to be thermally quenched from cryogenic temperatures to room temperature.

Typ publikacji

---

Artykuł

Licencja otwartego dostępu

---

CC-BY

Licencja na prawach której można swobodnie kopiować, rozprowadzać, zmieniać i remiksować objęty prawem autorskim utwór (Utwór-przedmiot prawa autorskiego) pod warunkiem podania imienia i nazwiska autora utworu pierwotnego oraz źródła pochodzenia utworu.

Pełny tekst licencji:

<https://creativecommons.org/licenses/by/3.0/pl/legalcode>

Adres publiczny

---

<http://dx.doi.org/10.1039/d1tc01526e>

Strona internetowa wydawcy

---

<https://www.rsc.org/>