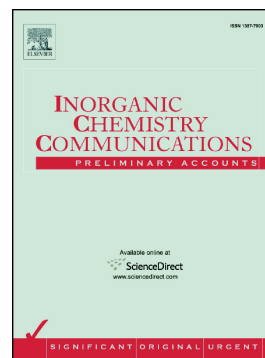


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## The structures, photoluminescence and photocatalytic properties of two types of iodocuprate hybrids

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Two new copper(I)-iodide clusters driven by 3,5-bis(imidazole-1-yl)pyridine (bip), [(H<sub>2</sub>bip)<sub>2</sub>Cu<sub>5</sub>I<sub>9</sub>] (**1**) and [H<sub>2</sub>bip]<sub>2</sub>[Cu<sub>3</sub>I<sub>7</sub>] (**2**), have been prepared *via* modulating organic/inorganic ratio at room temperature. Compound **1** presents a zero-dimensional structure constituting of [Cu<sub>4</sub>I<sub>8</sub>]<sup>4-</sup> and [(H<sub>2</sub>bip)<sub>2</sub>CuI<sub>2</sub>]<sup>3+</sup> two different subunits. Compound **2** features a discrete [Cu<sub>3</sub>I<sub>7</sub>]<sup>4-</sup> anionic cluster, which is the first isolated iodocuprate cluster with protonated bip as structure-directing agent (SDA). The structural diversity of **1** and **2** mainly stems from the distinct role of bip during the crystallization. Meanwhile, the reaction ratio here also plays an essential role on the fabrication of two structures. The solid-state luminescence bands of **1** and **2** have been investigated between 499 and 78 K. Both of them exhibit yellow luminescence, and their intensities increase gradually upon cooling. What is more, photocatalytic properties of **1** and **2** are investigated.

**Keywords:** Iodocuprates; Crystal structure; Photoluminescence; Photocatalysis

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