Luminescent nanoribbons based on 1D coordination polymers with Cu-I chains

Javier Conesa-Egea[†], G. Donati[‡], Sergio G. López[‡], Stefano Toffanin[‡], Salomé Delgado[†], Pilar Amo-Ochoa[†], Félix Zamora[†,≠]

[†] Universidad Autónoma de Madrid. Facultad de Ciencias, Departamento de Química Inorgánica and Condensed Matter Physics Center (IFMAC). 28049 Madrid, Spain.
[‡]Istituto per lo Studio dei Materiali Nanostrutturati. Via P. Gobetti 101, 40129 Bologna, Italy.
[≠] Instituto Madrileño de Estudios Avanzados en Nanociencia (IMDEA Nanociencia), Cantoblanco, 28049 Madrid, Spain.
javier.conesa@uam.es

Abstract

Modifying the synthesis conditions of the 1D coordination polymer $[Cu(MeIN)I]_n$, where MeIN is methyl isonicotinate (by fast precipitation with a poor solvent [1-2]), we have been able to obtain nanoribbons of the same polymer. These nanoribbons have been characterized by Scanning Electron Microscopy and powder X-ray diffraction. The last technique confirms that the nanoribbons keep the original crystal structure of the polymer. The SEM images show that the nanoribbons tend to aggregate into microribbons with sizes ranging from 2 to 5 µm (**Figure 1a**). We have proceeded to do a comparative study of the luminescent properties of the bulk material and these ribbons, observing a slight increase of the emission wavelength (**Figure 1b-d**) [3] and a decrease of the quantum yield, due to the size reduction. Furthermore, we have studied the variation of the emission of the nanoribbons with temperature.

References

[1] A. Carné, C. Carbonell, I. Imaz, D. Maspoch, *Chem. Soc. Rev.*, **40** (2011), 291
[2] J. Della Roca, D. Liu, W. Lin, *Acc. Chem. Res.*, **44** (2011), 957
[3] K. Hassanein, J. Conesa-Egea, S. Delgado, O. Castillo, S. Benmansour, J. I. Martínez, G. Abellán, C. J. Gómez-García, F. Zamora, P. Amo-Ochoa, *Chem. Eur. J.*, **21** (2015) 17282

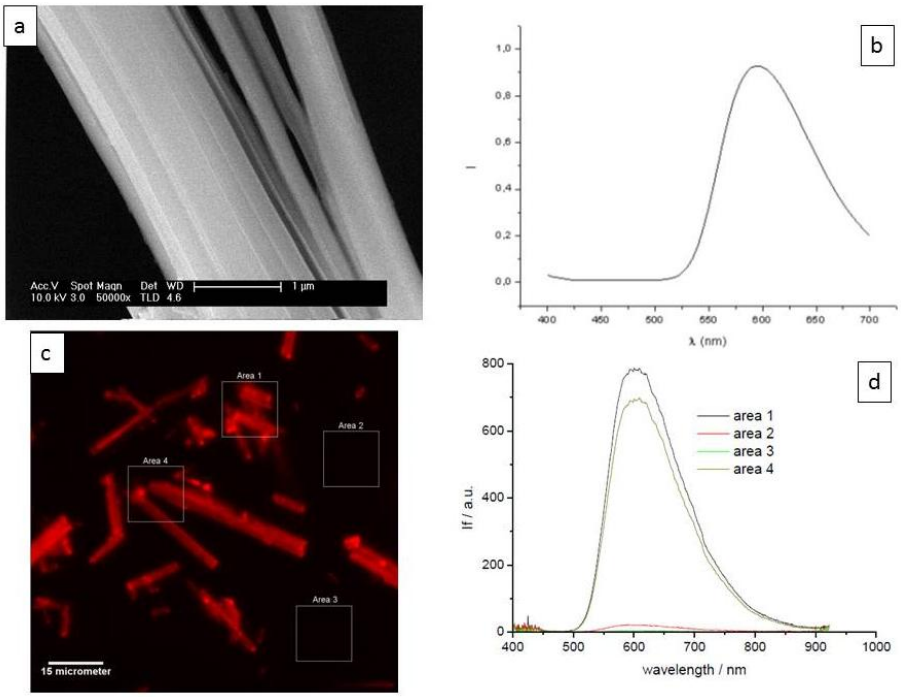

Figure 1. a: SEM images of the $[Cu(MeIN)I]_n$ nanoribbons. **b**: Luminescence spectrum of the bulk material. **c**: Confocal microscopy image of the $[Cu(MeIN)I]_n$ ribbons. **d**: Localized luminescence spectra of the four areas detailed in image **c**.