Highly Twisted Azobenzene Ligand Causes Crystals to Continuously Roll in Sunlight

A. K. Bartholomew, I. B. Stone, M. L. Steigerwald, T. H. Lambert, X. Roy *J. Am. Chem. Soc.* **2022**, *144*, *37*, 16773–16777

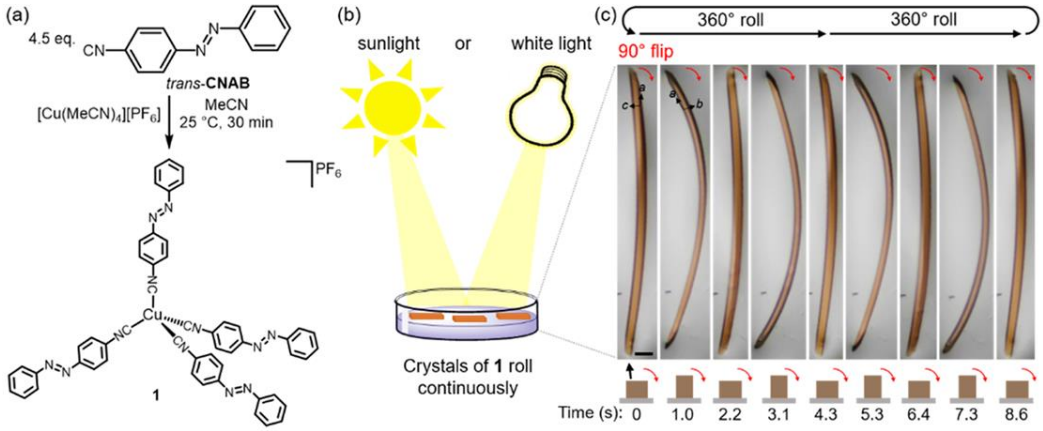

Fig 1: (a) Synthesis of 1. (b) Illustration of crystal rolling. (c) Images of a 1T crystal rolling

Who are the corresponding authors and what are their research areas?

Xavier Roy – *Associate Professor of Chemistry at department of Chemistry, Columbia University.*
Xavier Roy is the head of materials chemistry lab. He mainly focuses on the synthesis and application of organic and inorganic building blocks that can be assembled. He studies the collective physical properties that arise in these assemblies to create electronic and magnetic nanostructured materials.

What is the main claim of the article?

This article presents the first example of solar-driven continuous motion in single crystal of tetrahedral Cu(I)-isocyanoazobenzene complex which composed of highly-twisted azobenzene ligand. The rolling speed is linearly dependent on the light irradiance. The authors show that this reported rodlike Cu(I)-isocyanoazobenzene crystal could roll without apparent mechanical fatigue or damage upon 5 days continuously illuminated.

How is it demonstrated?

Authors show the x-ray crystallographic data and diffuse reflectance absorption spectra to reveal the fact that crystal packing plays an enormous role on the electronic absorption and physical response of an azobenzene chromophore. Also, the diffuse reflectance spectroscopy rationalizes why the crystal responses to the blue light.

What are the typical experimental conditions?

Typical condition for the rolling of the crystals under white light: irradiance 3000 W/m^2 (assessed at 532 nm)

Which are the key related papers?

1. P. Naumov, S. Chizhik, M. K. Panda, N. K. Nath, E. Boldyreva, *Chemical Reviews* **2015,** *115 (22)*, 12440-12490