

Gold isocyanide complexes with mechanical response

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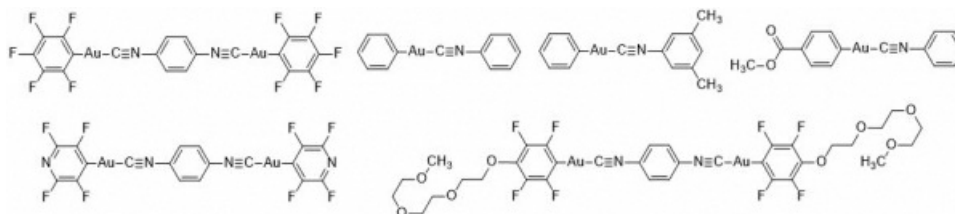
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Photoluminescent properties of many solid materials are known to be changed by a mechanical stimulus such as grinding, pressing, or ball milling. These compounds are recently attracting much attention. We previously reported the first reversible luminescent mechanochromism of a gold isocyanide compound in 2008.[1] We further reported that other isocyanide complexes show the first molecular-domino phenomena. Applying small mechanical stress to a small area on a crystal induces the single-crystal-to-single-crystal phase change of the whole crystal.[2] The new phase displays the different photoluminescent properties caused by the new crystal structures. Installing 4-perfluoropyridyl group gave a new material with multiple response abilities to stimuli including grinding and solvent addition. The introduction of triethylene glycol methyl ethers also gave a new mechanochromic material with crystal-to-crystal transformation mediated by a short-lived transient amorphous phase. Based on the screening method, we found a new photosensitive compound, which jumps after irradiation of a strong ultraviolet light.[3] By changing the substituents, we synthesized new 48 different complexes. Screening revealed that 26 new compounds show mechanochromism including crystal-to-amorphous transitions, and two compounds represent crystal-to-crystal transitions.

[1] Ito, H.; Saito, T.; Oshima, N.; Kitamura, N.; Ishizaka, S.; Hinatsu, Y.; Wakeshima, M.; Kato, M.; Tsuge, K.; Sawamura, M. *J. Am. Chem. Soc.* 2008, 130, 10044.

[2] Ito, H.; Muromoto, M.; Kurenuma, S.; Ishizaka, S.; Kitamura, N.; Sato, H.; Seki, T. *Nature Comm.* 2013, 4, 2009.

[3] Seki, T.; Sakurada, K.; Muromoto, M.; Ito, H. *Chem. Sci.* 2015, 6, 1491.



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