



PRESS RELEASE (2018/11/9)

New Method for Enhancing the Sensitivity of NMR/MRI at Room Temperature

The application of a previously developed method to increase the sensitivity of NMR and MRI at room temperature by using photo-excited triplet electrons has now been expanded to nanoporous metal-organic frameworks (MOFs). The research group of Associate Professor Nobuhiro Yanai and Professor Nobuo Kimizuka at the Faculty of Engineering, Kyushu University, along with researchers from RIKEN including Special Postdoctoral Researcher Kenichiro Tateishi and Chief Scientist Tomohiro Uesaka, are hoping that this development will pave the way towards the sensitive detection of biological molecules using more affordable systems.

This research achievement was published on November 8, 2018, in the online edition of *Journal of the American Chemical Society*.

“NMR/MRI sensitivity enhancement using photo-excited triplets is a powerful method, but so far its use has been limited to crystalline samples.” says Yanai “We have now opened the possibility to using it for biologically important small molecules in water through the introduction of MOF chemistry.”

For more information about this research, see Yanai N. et al., Dynamic Nuclear Polarization of Metal-Organic Frameworks using Photo-excited Triplet Electrons, *Journal of the American Chemical Society*, DOI: 10.1021/jacs.8b10121

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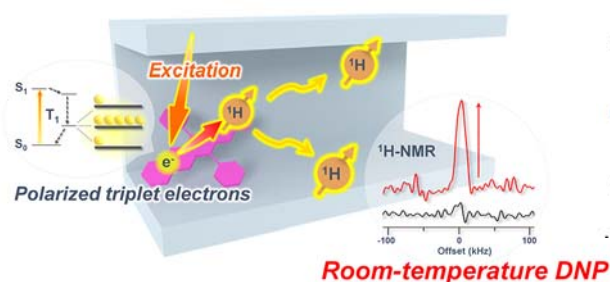


Fig. 1.

Schematic illustration of room-temperature enhancement of NMR signal of metal-organic frameworks (MOFs) using photo-excited triplet electrons.

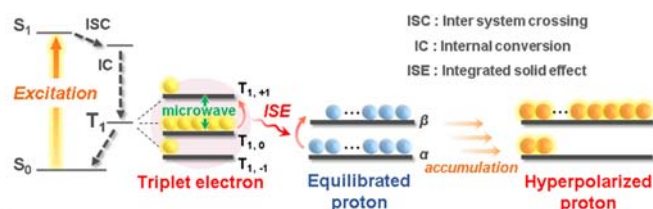


Fig. 2.

Mechanism of dynamic nuclear polarization using photo-excited triplet (Triplet-DNP). The large electron spin polarization of the photo-excited polarizing agent is transferred to the nuclear spin polarization.

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