Novel NMR Tube for In-Situ Photochemical Reactions Under Inert and Controlled Atmospheres

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BACKGROUND

Currently, in-situ irradiation of samples inside a nuclear magnetic resonance (NMR) spectrometer can only be carried out under standard atmosphere using a fiber optic in combination with a commercially available coaxial insert for NMR tubes.

BRIEF DESCRIPTION

Dr. René Riedel and Stephen Lepore from the University of California, Riverside have developed an NMR tube/reactor that enables in-situ irradiation to photo-initiate reactions in an inert or controlled atmosphere. It allows for the data acquisition of air, moisture, and temperature-sensitive liquid samples by nuclear magnetic resonance (NMR) spectroscopy without needing to remove the sample from the spectrometer for irradiation. This technology is advantageous because it makes photochemical reactions and kinetic measurements of sensitive samples more reproducible, and it enables the previously impossible maintenance of a controlled environment during photochemical NMR investigations.

Fig 1: Conventional Ex-Situ NMR Reaction Containers. These containers are not capable of real-time, in-situ data collection of photochemical reactions under inert atmosphere.

APPLICATIONS

- An NMR tube for sensitive samples that enables in-situ data measurements for photochemical reactions with LED irradiation.
- For use as a photochemical reaction monitoring tool for industries like Pharmaceuticals, Materials Science, Chemical Manufacturing, and Research and Development.

PATENT STATUS

Patent Pending

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OTHER INFORMATION

KEYWORDS

Nuclear magnetic resonance, NMR, sample tube, coaxial insert, in situ, irradiation, photochemistry, photoexcitation, inert

CATEGORIZED AS

- **Materials & Chemicals**
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- **Research Tools**
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