

# Sealed Nanoreactors for X-Ray Dose Detection

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## ABSTRACT

Researchers at the University of California, Davis have developed a nanoreactor that allows for accurate measurements of radiation dose even in the vicinity of other chemicals.

## FULL DESCRIPTION

There are currently no techniques for measuring X-ray doses or dose enhancement factors reliably in the presence of nanoparticles. All current methods are unable to isolate the measurements from nanoparticle catalysts or radical scavengers, which makes it difficult to measure the actual X-ray dose. Additionally, no techniques have been developed that allow for the use of nanoreactors in X-ray dose detection.

Researchers at the University of California, Davis have developed a nanoreactor that allows for accurate measurements of radiation dose while other chemicals are nearby. The spherical nanoshell of this system consists of mesoporous silica that prevents potentially interfering chemicals on the outside from entering into the nanoreactor. The nanoreactor contains probing molecules that undergo chemical reactions with reactive species when irradiated. As a result, fluorescent molecules are produced that allow the detection and measurement of the X-rays. This technique allows for the probing molecules to be in the vicinity of, but physically separated from, interfering chemicals. Additionally, the shape of the shell can be modified to better line up with a magnetic field or be easier to imbed within a matrix. This nanoshell can also be used to store drugs

## APPLICATIONS

- ▶ X-Ray dose detection.
- ▶ Store drugs or other molecules for irradiation.

## FEATURES/BENEFITS

- ▶ More accurate than any other dose detection technique.
- ▶ Novel shell material keeps interfering molecules away from probing molecules.
- ▶ Reaction with probing molecules produces fluorescent molecules for easier detection.
- ▶ Adjustable shape of shell allows for customization based on need.

## PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Published Application	<a href="#">2021038218</a>	12/09/2021	2019-095

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## OTHER INFORMATION

### KEYWORDS

X-Ray detection,  
 nanoreactor, nanoshell

### CATEGORIZED AS

- ▶ **Biotechnology**
- ▶ Health
- ▶ **Materials & Chemicals**
- ▶ Nanomaterials
- ▶ **Medical**
- ▶ Diagnostics
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- ▶ **Nanotechnology**
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2019-095-0

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