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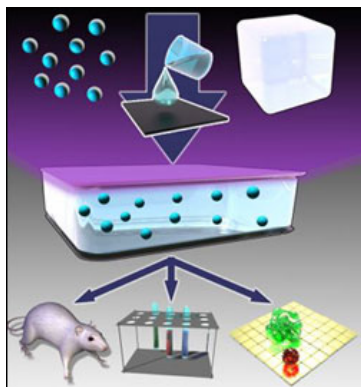
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Glass-Based LEDs Go UV

LOS ALAMOS, N.M., Feb. 28, 2012 — Inorganic LEDs that emit in the difficult-to-achieve ultraviolet range were produced by embedding nanocrystals in glass, a step toward using such devices in biomedical applications.

Scientists at the Los Alamos National Laboratory, in collaboration with researchers at the University of Milano-Bicocca in Italy, developed the new inorganic UV LEDs by combining the chemical inertness and mechanical stability of glass with the property of electric conductivity and electroluminescence.



Embedding nanocrystals in glass provides a way to create UV-producing LEDs for biomedical applications. (Image: Los Alamos National Laboratory)

In standard LEDs, light emission occurs at the sharp interface between two semiconductors. The oxide-in-oxide design used by the LANL-led team is different, as it allows production of a material that behaves as an ensemble of semiconductor junctions distributed in the glass. The resulting LED is rugged enough to be used in harsh environments, such as immersion into physiologic solutions or implantation in the body. This robustness was made possible through the design of a new synthesis strategy that allows fabrication of all-inorganic LEDs via a wet-chemistry approach (a series of simple chemical

reactions in a beaker). Importantly, with a very low startup cost, this method is scalable to industrial quantities and is inexpensive.

Devices suitable for applications in biomedical diagnostics and medicine could selectively activate light-sensitive drugs or probe for the presence of fluorescent markers in medical diagnostics, said Sergio Brovelli of LANL. These devices would have to be fabricated cheaply on a large scale and be integrated into existing technology.

The research appeared online in *Nature Communications*.

For more information, visit: www.lanl.gov

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