NEW MEXICO WATER RESOURCES RESEARCH INSTITUTE

# Enhanced photocatalysis for water purification and disinfection using optical fibers coated with nanocomposite thin films


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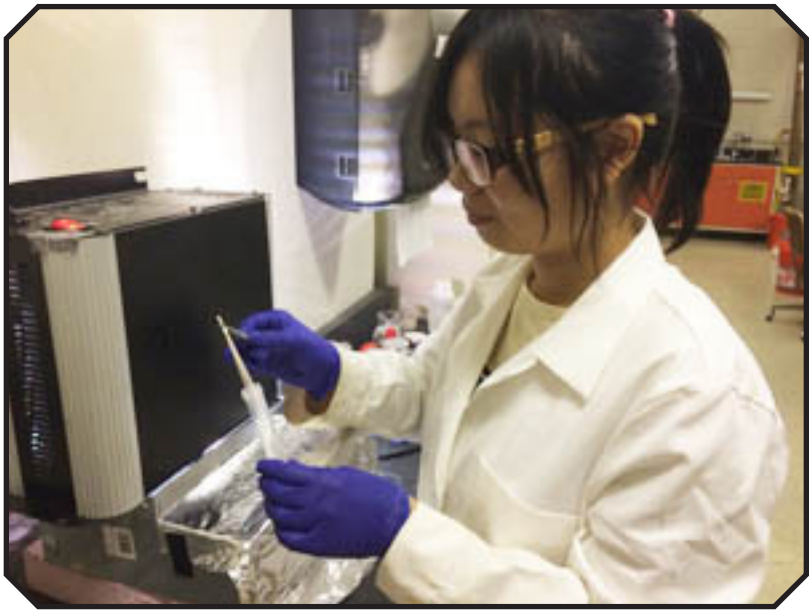
## Purpose of Study

Reclaimed water provides a drought-proof, environmental-friendly, and economical water resource for augmenting local water supplies. However, with the increased reliance on such water recycling, there are potential risks for public health and environment due to accumulation of persistent micropollutants. The objective of this study is to develop highly effective photocatalysts and investigate their photocatalytic performance using the innovative photoreactor for degrading environment contaminants (e.g., pharmaceuticals and disinfection by-products) in reclaimed water, and disinfecting water under natural sunlight.



*Lu Lin is working on a master's degree in the civil engineering department at NMSU and in this photo is preparing fibers for a photoreactor. She has a B.S. in engineering and environmental engineering from Beijing Normal University in China. Lin has received numerous awards including the 29th Annual WateReuse Symposium Best Poster Award in 2014.*

## Study Underway

To achieve the overall objective, the research is organized into two tasks: (1) Design, synthesize, and characterize optical fibers coated with metal oxide nanocomposite films to produce new functionalities and to improve the quantum yield; and (2) Evaluate the photocatalytic efficiency of the nanocomposite films.

## Benefits

The novel photoreactor can potentially make photocatalysis a critical technology for integrated water resources management, which will have broad applications such as safe drinking water for population living in remote areas, Indian tribes; water reuse; and onsite treatment of oil field wastewater, e.g., produced water; and treatment of oil leakage.

In December 2014, Lu Lin submitted a paper on her project for publication to the *Journal of Photochemistry and Photobiology A: Chemistry.*