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FOR IMMEDIATE RELEASE

## UT Chemist Earns NSF Grant for “Smart” Chemical Research

KNOXVILLE -- University of Tennessee chemist Bin Zhao is finding ways to make molecules smarter.

The National Science Foundation (NSF) has awarded Zhao a three-year, \$285,000 grant to continue his research on “smart” polymers that are designed to respond to environmental temperature changes. The polymers form box-like containers in water that, as temperature changes around them, release their contents.

When used in the context of medicines, the polymer, acting as a sort of capsule, would contain drug molecules. By responding to the changes in temperature of different areas of the body, the molecule would “know” the most effective time to release the drug.

Zhao is specifically developing molecules that can respond at more than one temperature, a trait termed as multiple transitions. “The structure and function of multi-responsive polymers in water can be finely tuned to meet the demands of various applications”, Zhao says.

Beyond their potential medical applications, the thermosensitive polymers Zhao is developing could be used in a number of fields. For example, with a properly designed system by use of these polymers, chemical reactions can be “turned on and off” by temperature.

Zhao's research is part of a growing trend in chemistry and other fields of science towards nanotechnology. By working with molecules on a scale less than a thousandth of the width of a human hair, scientists are able to narrowly tailor their function.

In his research, Zhao will build these polymers and then analyze their structures through a variety of means to better understand their functions. His goal is to provide guidelines on how to design these polymers in the future for applied uses.

Zhao will involve undergraduate students and high school teachers in his polymer chemistry research. “Students will find doing research in the lab is fun”, Zhao says.

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