Oklahoma State University is the residency of Dr. Nicholas F. Materer. For those of you who do not know, Dr. Materer is a professor in the chemistry department and performs research with the university. With research interests in the experimental surface chemistry field he is always looking to push the boundaries of science in pursuit of a better understanding of the world we live in. Currently Dr. Materer is working on multiple projects including but not limited to: semiconductor surface chemistry, sputtering of surfaces and working with the department of defense studying chemical deactivation of common explosives. One of his more recent projects has to do with making detectors for when vapor levels of hydrogen peroxide, emitting from chemical reactions, are at unsafe levels.

First off, a little background on the man in question. Dr. Materer started his journey attending the University of Missouri, Columbia and received a Bachelor of Science. His next step was to head out to the notorious University of California, Berkley where he received his Ph.D. After attaining his education, Dr. Materer went for a postdoctoral fellow at JILA, University of Colorado, Boulder. When his time in Boulder was finished he ended up coming to Oklahoma State where he would perform his research and be a professor.

One of the most recent works of Dr. Materers’ research has to do with hydrogen peroxide and tATP (acetone peroxide). Hydrogen peroxide and tATP are both vapor by-products of some chemical reactions that, when exposed to certain levels, are harmful to our bodies. This research he was performing was testing the response of films to hydrogen peroxide and tATP, attempting to make some sort of detection system that would be able to alert us when vapors are at unsafe levels. Vapors of hydrogen peroxide and tATP are very difficult to detect and having some sort of device that would be able to alert us would be very helpful in creating safer working environments for those that work with such vapors.

The overall goal of the research was to find out the chemical process of vapors leading to a color change of a material, being able to detect this color change, and how much color we can see reproducibly. He was looking to find a type of material that could be used as a detection device that would change colors when exposed to unsafe levels. When vapors are given off from reactions they would be absorbed into some type of material that would produce a color change, and to know the chemistry behind this color change and to see reproducible results was the ultimate goal. Most of the study was conducted through experimental research with molybdenum, the material to detect color change, and with computational chemistry.

Throughout the study there were some difficulties faced that had to be overcome. The hardest part, Dr. Materer mentioned, was being able to come up with accurate computational modeling and coming up with a theoretical model of how things happened. Other problems such as being able to get accurate measurements was tough because there were so many influential factors in the experiments, this type of chemistry, he mentioned, was “very unstable and dangerous.”

Materer, Nicholas. “Experimental and Computation Studies of the Reaction of Hydrogen Peroxide and Methyl Hydroperoxide on Molybdenum Hydrogen Bronze Surfaces.” *Topics in Catalysis.* April 25, 2018.