

WIU CENTENNIAL HONORS COLLEGE
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Abstract

Poster

Major: Chemistry

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Analyzing Illicit Drugs Using Silver Nanoparticles

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This research project seeks to use nanoparticles to detect illicit drugs such as a methamphetamine analog. Nanoparticles have a diameter of less than 100 nanometers in size. Coinage metal including copper, silver, and gold nanoparticles are stable with high refractive indices. These characteristics allow for a visual color change to detect the drug. The detection is helpful in the forensic field and can further aid law enforcement in identifying unknown substances in an efficient manner. Research has been performed using gold nanoparticles. However, gold is not considered cost efficient. By using a different metal with similar chemical and optical properties to gold, the methamphetamine analog can be efficiently detected while reducing the cost.

The detection of methamphetamine is performed using the colorimetric test. Metal nanoparticles have vivid visible colors due to high refractive indices. This makes them susceptible to change due to interaction with illicit drugs. Aptamers are oligonucleotides, peptide molecules, which selectively interact with the drug of interest. The aptamer is used to enhance the interaction of the nanoparticles with the methamphetamine analog. Interaction with the drug of choice causes a change in the surface structure of the nanoparticles. This change in structure will cause a visible change in the color of the aptamer coated nanoparticles. The color change can be quantified using a UV-Vis detector, and the shape and size of particles are imaged using Scanning Electron Microscopy (SEM). Our goal is to efficiently detect a methamphetamine analog, that aids law enforcement in detecting illegal substances.