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Fundamental interaction between Au quantum dots and DNA

MOLLESHREE KARNA, Science & Math Academy/Aberdeen High School US-ARL, GOVIND MALLICK, SHASHI KARNA, US Army Research Laboratory — Semiconductor quantum dots (QDs) and metal nanoparticles (NPs) have attracted a great deal of attention in biology community due to their application as fluorescent labels and sensors. The optical properties of QDs and NPs allow them to be effective imaging agents. However, QDs have the potential to be used as more than just sensors and labels. Their biological sensing abilities include identifying target DNA through a linker followed by color change and electrical signaling. If this property can be combined with the direct binding of QDs with DNA, many other applications in bio-nanotechnological field are possible. In this paper, we investigate the interaction between colloidal Au QDs and 30-base sequence single strand DNA. Our preliminary results indicate that the DNA strand tend to form different structures in the presence of Au QDs. Furthermore, small as well as large agglomerated Au particles appear to be linked along the DNA strand.

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