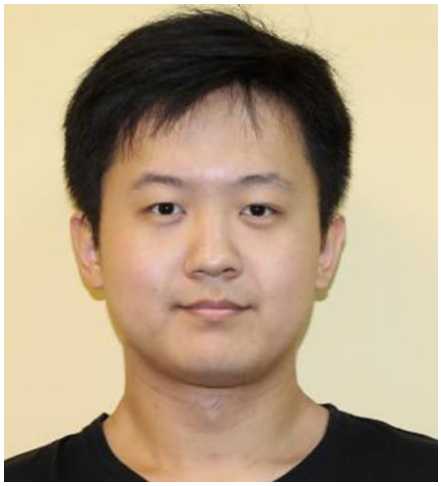
Department of Chemistry Seminar Series

Spring 2023

Friday, March 10, 2023, 3:30 PM – HPA1-O119 (Health Sciences)

Catalytic Gold-Iridium Nanoparticles as Labels for Sensitive Colorimetric Lateral Flow Assay



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The colorimetric lateral flow assay (CLFA, also known as test strip) is a widely used point-of-care diagnostic technology. It has been a challenge to significantly improve the detection sensitivity of CLFA without involving additional equipment and/or compromising its simplicity. In our research work, we break through the detection limit barrier of CLFA by developing a type of catalytic nanoparticles (NPs) used as labels. Specifically, the NPs were engineered by coating conventional gold NPs (AuNPs) with iridium (Ir) to form an Au-Ir core–shell structure. Such Au-Ir NPs possess ultrahigh peroxidase-like catalytic activities. A single Au-Ir NP can generate up to 10^7 colored molecules per second by catalyzing peroxidase substrates. The strong color signal from the catalysis ensures a high sensitivity of associated CLFA. The Au-Ir NP-based CLFA was successfully applied to the detection of two different cancer biomarkers that achieved limits of detection at the low picogram per milliliter level, hundreds of times lower than those of conventional AuNP-based CLFA.