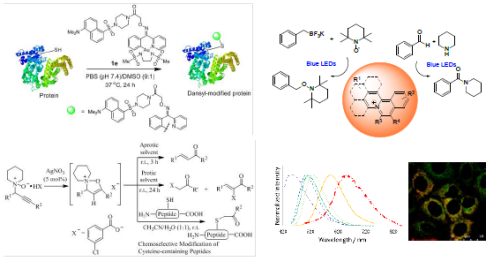
Gold and Silver Catalysis for Bioconjugation and Molecular Imaging

Man-Kin Wong, Jian-Fang Cui, Jie-Ren Deng, and Nathanael Chun Him Lai*

State Key Laboratory of Chirosciences and Department of Applied Biology and Chemical Technology, The Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong, China. E-mail: mankin.wong@polyu.edu.hk

Gold and silver catalysis have recently received considerable attention in transition metal catalysis. Owing to their excellent selectivity, high reactivity, and exceptional tolerance to air/moisture reaction conditions, gold and silver catalysts are capable of catalyzing a variety of novel organic transformations under mild reaction conditions. Bioconjugation allows covalent attachment of biophysical probes to oligosaccharides, peptides, and proteins aiming to study complex biological systems. However, modification of biomolecules is a challenging task due to a number of stringent requirements including unprotected functional groups, aqueous medium, narrow pH (6–8) and temperature (4–37 °C) range, and low biomolecule concentration (below 100 μM). Built on our previous works,[1,2] we have recently developed new gold and silver catalysis for selective bioconjugation of peptides and proteins.

Development of new fluorescent molecules is of importance due to their diverse applications in chemical, biological and materials science. Using visible light mediated gold-catalyzed cycloaddition, we have recently synthesized a series of fluorescent quinolinium compounds with large Stokes shift (up to 191 nm) and tunable emission wavelength (455 – 652 nm). These newly developed fluorescent quinolinium compounds have been used as photocatalysts for visible light photoredox catalysis and fluorescent dyes for live cell molecular imaging.



References

[1] Kung, K. K.-Y.; Ko, H.-M.; Cui, J.-F.; Chong, H.-C.; Leung, Y.-C.; Wong, M.-K. *Chem. Commun.*, **2014**, *50*, 11899-11902.

[2] Cui, J.-F.; Kung, K. K.-Y.; Ko, H.-M.; Hui, T.-W.; Wong, M.-K. *Adv. Synth. Catal.*, **2014**, *356*, 2965-2973.