Development of (N^C,C^O) Cyclometallated Gold(III) Catalysts and Visible Light-Gold Catalysis for Organic Synthesis

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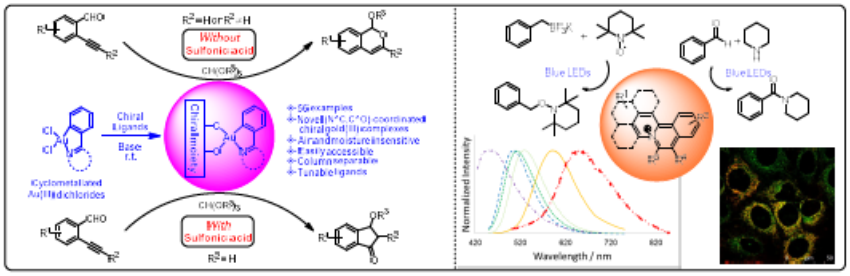
Gold(I) complexes have been demonstrated as efficient catalysts to achieve novel organic transformations. A significant challenge in the development of gold(III) complexes as efficient catalysts is to strike a balance between stability and reactivity. In general, the stability of gold(III) ions significantly increases upon complexation with ligands. However, stable gold(III) complexes generally exhibit poor catalytic activity. Built on our previous works,[1,2] here we present a new class of easily accessible, stable, and tunable (N^C,C^O) cyclometallated gold(III) catalysts that are able to activate 2-alkynylbenzaldehydes towards tandem acetalization and regio- and chemoselective cycloisomerization/carboalkoxylation with high conversion (up to 100%) and yield (up to 92%).

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). The newly developed fluorescent quinolinium compounds have been used as photocatalysts for visible light photoredox catalysis and live cell molecular imaging.



References

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(2) Ko, H.-M.; Kung, K. K.-Y.; Cui, J.-F.; Wong, M.-K. *Chem. Commun.*, **2013**, *49*, 8869-8871.

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