Opened-Fmoc group: protecting group activated by gold catalyst

(*[1]RIKEN CPR, [2]Sch. Mater. & Chem. Tech., Tokyo Tech., [3]A. Butlerov Inst. of Chem., KFU*)
○Tomoya Yamamoto,[1] Katsunori Tanaka[1,2,3]

Keywords: *Gold catalysis, Protecting group, Peptide synthesis, In vivo reaction*

Orthogonal protecting groups, which are chemoselectively removable with specific reagents, are essential for the synthesis of complex natural products, branched peptides, and oligosaccharides. Previously, palladium-labile (such as allyl and allyloxycarbonyl group), hydrazine-labile (such as levulinoyl group), and oxidant-labile (such as *p*-methoxybenzyl group) protecting groups have been developed as orthogonal protecting groups and applied for the synthesis of complex compounds. Although various orthogonal protecting groups have already been developed, there are still limitations in its application such as the stability of protecting groups and the harshness of the deprotection condition. Furthermore, the number of choices for protecting groups is the key to the efficient synthesis of complex molecules. Therefore, it is important to develop a protecting group with novel deprotection conditions.

In this study, we have developed a novel protecting group chemoselectively removable with a gold-catalyzed transformation and a subsequent reaction with piperidine (**Figure 1**). This protecting group is stable under acidic and basic conditions which are generally used for the deprotection of general protecting groups. On the other hand, the gold catalysis transforms this structure quickly (less than 10 minutes), and the resulting structure is labile to mild basic conditions using piperidine. We have applied this protecting group to various functional groups such as amine and alcohols of peptide and sugar derivatives. In addition, the transformation and removal of this protecting group proceed quickly even on resins. Thus, this protecting group is applicable to the solid-phase synthesis of branched and cyclic peptides.

We have also found that the gold-catalyzed transformation of this protecting group proceeds under aqueous conditions, and thus is promising for biocompatible reactions. We will report the application of this protecting group for masking and uncaging of bioactive molecules *in vivo*.

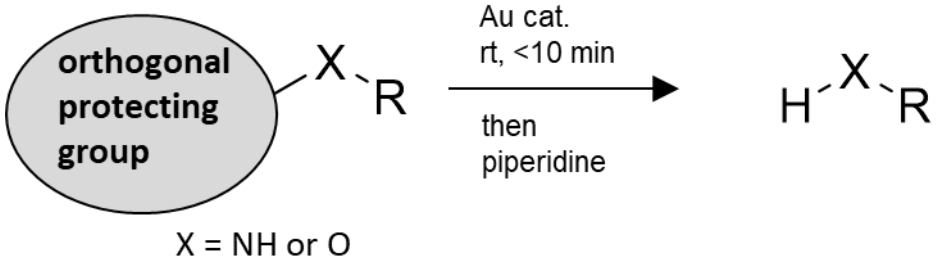

Figure 1. Novel protecting group activated by gold catalysis