The Takai Olefination: Simple Access to E-Alkenyl Halides

Significance: In 1986 Takai and co-workers developed a simple procedure for the stereoselective preparation of E-alkenyl halides from various aldehydes by using an excess of CrCl₂ together with a haloform. The selectivity was dependent on the corresponding haloform and decreased in the order Cl > Br > I.

Comment: The mild reaction conditions enable highly chemoselective transformations. Thus, the olefination of an aldehyde proceeds smoothly in the presence of ketone moieties. Given the unique chemo- and stereoselectivity, several modifications and improvements of this method have been published over the years.

Selected examples:

- 87% yield E/Z = 94:6
- 78% yield E/Z = 94:6
- 78% yield E/Z = 89:11
- 55% yield E/Z = 89:11
- 55% yield E/Z = 92:8
- 73% yield E/Z = 81:19
- 75% yield 51% yield

Competition experiments: