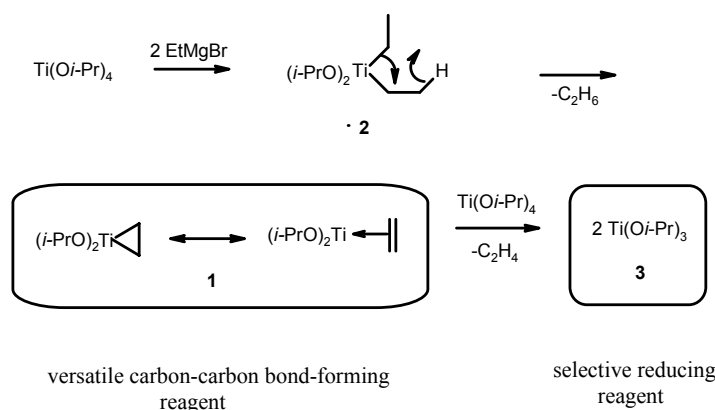


Low-valent Titanium Alkoxides as Versatile Reagents for Organic Synthesis

Oleg G. Kulinkovich

*Department of Chemistry, Belarusian State University,
Fr. Skaryny av. 4, Minsk, 220050, Belarus*

Treatment of titanium(IV) isopropoxide with ethylmagnesium bromide leads to the formation of unstable diisopropoxytitanacyclopropane (titanium(II)-ethylene complex) **1** by elimination of ethane from diethyltitanium precursor **2**. Reagent **1** and its homologues could effectively initiate intermolecular carbon-carbon forming reactions with various unsaturated compounds as well as interact with starting titanium(IV) isopropoxide to afford titanium(III) isopropoxide species **3**.



Reactions of titanacyclopropane **1** with carboxylic esters leading to two-fold alkylation of ester carbonyl carbon and the formation of 1-substituted cyclopropanols attract our special interest, due to usually high yields of the products and latent multifunctionality of the cyclopropanols. The cyclopropanation of the esters with reagent **1** and following regioselective ring-opening reactions of substituted cyclopropanols allow the preparation of various saturated and unsaturated ketones, α,β -epoxyketones, 2-substituted allyl halides, 1,3-dienes, 5-substituted isoxazoles and some other functional compounds. The capability of reagent **1** to initiate the ethylation of allylic compounds, together with a high efficient promotion of a reductive cleavage of carbon-halogen and nitrogen-oxygen covalent bonds by reagent **3**, creates additional perspectives for wide use of low-valent titanium alkoxides in directed organic synthesis. Recent examples of the applications of these reagents for the syntheses of biologically active natural products will be presented.