

ABSTRACT

Thermal cyclotrimerization was first discovered in 1866 by Bertholet, then, in 1948, Reppe and Schweckendiek reported the first transition metal catalyzed [2+2+2] cyclotrimerization of alkynes using Ni complexes. In the following 70 years of research, transition metal catalyzed [2+2+2] cyclotrimerization have become a powerful method for the synthesis of variously decorated aromatic rings and new catalytic systems as well as reaction conditions have been successfully applied.

Herein, I would like to show the use of this reaction for the synthesis of the important class of fluorene-based compounds.

In particular, a regioselective cyclotrimerization of 2,4-disubstituted fluorenols was achieved by Ru-catalyzed partially intermolecular [2+2+2] cyclotrimerization of diynes with terminal alkynes.

Rh-based complex proved to be a straightforward transition metal catalyst for the construction of selectively fluorinated [5] and [6]helical dispiroindenofluorenes using intramolecular [2+2+2] cycloaddition of triynediols as the key synthetic step.

Moreover, Ni complexes demonstrated to be a valid choice for the selective synthesis of unsymmetrical [7]helical indenofluorenones, while other catalytic systems based on Rh, Ru, Pd and Co gave mixture of the desired cyclotrimerization compound together with the dehydro-Diels-Alder side-products.

Enantioselective cyclotrimerization for the synthesis of enantioenriched [7]helical indenofluorenones were also attempted.