

## **Abstract**

This work deals with the development of methodology, which couples reactive intermediates of varying oxidation states, in tandem sequences comprising 1,2-organometallic addition/transition metal catalyzed isomerization/Michael addition/SET oxidation/radical cyclization/oxygenation steps in the synthesis of highly functionalized carbocycles. Implementation of this sequence being catalytic in the SET oxidant was studied. 1,4-Diketones were synthesized in a tandem 1,2-addition/ruthenium-catalyzed redox isomerization/enolates oxidation/radical dimerization reaction and results were compared with 1,4-diketones formation via oxidative coupling of ketone enolates. The total synthesis of selective tetrahydrofuran lignans from 1,4-diketones obtained in a tandem addition/isomerization/dimerization reaction is also documented