Rearrangements of Aromadendrene and Ledene in Acid Media

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For the first time ledene 1 and aromadendrene 2 were transformed in acid-catalyzed reactions to different triciclic and spiro compounds with natural types of skeleton. Their structures were confirmed by $^1$H and $^{13}$C NMR data and the 2D spectrum of $^{13}$C-$^{13}$C correlation. Boiling of compounds 1-6 in formic acid results in the formation of compound 9 with new type of skeleton. The mechanisms of rearrangements were theoretically analyzed using molecular mechanics and quantum chemical calculations.

A - HSO$_3$F-SO$_2$FCl; 
B - HCOOH; 
C - TiO$_2$/SO$_4^{2-}$; 
D - SiO$_2$