

MICROWAVE-INDUCED CONVERSION OF ELECTROMAGNETIC ENERGY INTO HEAT ENERGY IN DIFFERENT SOLVENTS: SYNTHESIS OF β -LACTAMS

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Abstract. This article describes the effect of loss tangent ($\tan\delta$) values of the solvents in the stereospecific synthesis of optically active cis β -lactams under diverse microwave-induced conditions. The effects of low $\tan\delta$ values of the solvents are found to be more crucial than solvents with high dipole moments and dielectric constants. Although, a significant progress of microwave-induced reactions has been registered lately, no reports have examined the $\tan\delta$ values of the solvents in reactions conducted in a microwave. In this study, the synthesis of hydroxy- β -lactams under microwave irradiation with diverse solvents was considered by focusing on their $\tan\delta$ values. The results indicated that for the synthesis of β -lactams solvents with low $\tan\delta$ and high dipole moment and high dielectric constant are necessary. Compared to DMSO ($\tan\delta= 0.82$) and DMF ($\tan\delta= 0.16$), dichloroethane ($\tan\delta= 0.12$), dichloromethane ($\tan\delta= 0.04$) and tetrahydrofuran ($\tan\delta= 0.04$) are observed to be more effective.

Keywords: β -lactam, loss tangent, microwave, stereospecific, optically active.

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