

STEREOCHEMICAL CONTROL IN MICROWAVE STIMULATED ACYLATION REACTIONS.

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ABSTRACT

There is an extensive body of literature reporting rate enhancements when organic reactions are carried out in the presence of a microwave field. Much of this relates to reactions performed in pressure vessels where the rate enhancement observed occurs as a function of the elevated boiling points that result from the autothermal pressure within the sealed system. An alternative approach has been to support the reagents onto the surface of an absorbent material prior to irradiation. While some remarkable results have been reported little is known of the surface temperatures generated in these experiments and therefore comparison with conventionally heated experiments is difficult.

This paper, reports the findings from the microwave stimulation of the acylation of toluene and anisole with organic acids. The reactions have been performed using catalytic quantities of solid acid catalyst and carefully controlled comparisons have been carried out between conventional and microwave heating. Results from two types of reactor system, a batch reactor operating at ambient pressure and a flow system again working nominally at atmospheric pressure will be detailed. Typically, the results show that microwaves are not only capable of providing a rate enhancement but in certain circumstances are capable of affecting the selectivity; whereby the yield of the para isomer is enhanced at the cost of the normally predominate meta isomer. The origins not only of the rate enhancement but also the change in selectivity will be explored.