

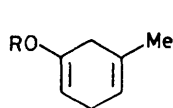
## Synthesis of 2-Alkenyl-3-methylcyclohex-2-en-1-ones

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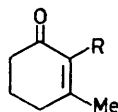
*Summary* The 2-diethylaminoethyl ether of 2,5-dihydro-*m*-cresol is metallated with Bu<sup>n</sup>Li-hexamethylphosphoric triamide (HMPA) and then alkylated and hydrolysed to yield 2-alkenyl-3-methylcyclohex-2-en-1-ones (**3**).

IN connection with a synthetic problem we required a variety of 2-alkenyl-3-methylcyclohex-2-en-1-ones (**3**); some could be prepared by the classical Hagemann's ester route<sup>1</sup> but, with others, the method failed at either the alkylation or hydrolysis stages even using modified procedures.<sup>2</sup> The

cyclohexane-1,3-dione route to the enones is limited because the dione can only be alkylated in good yield with reactive halides<sup>3</sup> but has recently been extended by the metallation and alkylation of dihydroresorcinol dimethyl ether with a wide variety of halides.<sup>4</sup> However certain of our homoallyl halides failed to react by this method. We also found that the kinetic enolate<sup>5</sup> from 3-methylcyclohex-3-en-1-one could be alkylated only with reactive halides, *e.g.*, allyl and prop-2-ynyl. In order to overcome these problems we first attempted, unsuccessfully, to metallate the methyl ether (1) with Bu<sup>n</sup>Li-hexamethylphosphoric triamide



(1); R = OMe

(2); R = OCH<sub>2</sub>CH<sub>2</sub>NEt<sub>2</sub>

(3)

increase the stability of the ion pair. The ether (2) was smoothly formed by Birch reduction† and metallation with Bu<sup>n</sup>Li-HMPA-THF (1 h) at 70 °C followed by addition of halide gave, after hydrolysis with 2N HCl-Me<sub>2</sub>CO, the required cyclohexenones (3) (see Table). We believe that this technique should have wide applicability.

TABLE

Halide	% Yield of (3)
CH <sub>2</sub> =CH[CH <sub>2</sub> ] <sub>2</sub> Br	86
CH <sub>2</sub> =CHCH <sub>2</sub> Br	88
<i>p</i> -MeOC <sub>6</sub> H <sub>4</sub> [CH <sub>2</sub> ] <sub>2</sub> CH=CH[CH <sub>2</sub> ] <sub>2</sub> Br	89
<i>m</i> -MeOC <sub>6</sub> H <sub>4</sub> [CH <sub>2</sub> ] <sub>2</sub> CH=CH[CH <sub>2</sub> ] <sub>2</sub> Br	85
<i>p</i> -MeOC <sub>6</sub> H <sub>4</sub> [CH <sub>2</sub> ] <sub>2</sub> Br <sup>a</sup>	78
MeC(Cl)=CH[CH <sub>2</sub> ] <sub>2</sub> Cl	80

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(HMPA) in tetrahydrofuran (THF). We then studied metallation of the diethylaminoethyl ether (2), reasoning that the presence of an efficient chelating group might

† Compound (2) appeared to undergo reduction more readily than (1). We have not investigated the alkylation of any species formed *in situ*.

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<sup>5</sup> R. E. Donaldson and P. L. Fuchs, *J. Org. Chem.*, 1977, 42, 2032.