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Publisher Taylor & Francis

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## Phosphorus, Sulfur, and Silicon and the Related Elements

Publication details, including instructions for authors and subscription information:

<http://www.informaworld.com/smpp/title~content=t713618290>

### Unusual and Efficient (Z)-Stereoselective Peterson Synthesis of 2-Diethoxyphosphonyl-1-Alkoxy-3-Methylpenta-1,3-Dienes. Their use in the Diels-Alder Reaction

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**To cite this Article** Al-badri, Hashim , About-jaudet, Elie and Collignon, Noel(1996) 'Unusual and Efficient (Z)-Stereoselective Peterson Synthesis of 2-Diethoxyphosphonyl-1-Alkoxy-3-Methylpenta-1,3-Dienes. Their use in the Diels-Alder Reaction', Phosphorus, Sulfur, and Silicon and the Related Elements, 111: 1, 120

**To link to this Article:** DOI: 10.1080/10426509608054749

**URL:** <http://dx.doi.org/10.1080/10426509608054749>

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# UNUSUAL AND EFFICIENT (Z)-STEREOSELECTIVE PETERSON SYNTHESIS OF 2-DIETHOXYPHOSPHONYL-1-ALKOXY-3-METHYLPENTA-1,3-DIENES. THEIR USE IN THE DIELS-ALDER REACTION.

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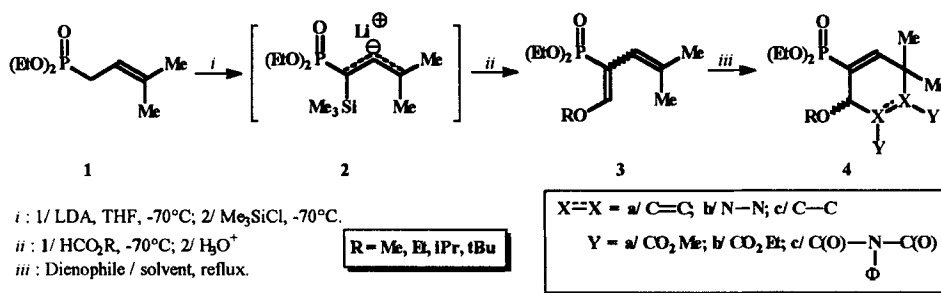
**Abstract** *In situ* generated from diethyl prenylphosphonate 1, carbanion 2 reacts with alkyl formates leading to phosphonodienes 3, which are used in Diels-Alder reactions to give phosphonoadducts 4.

## INTRODUCTION

Peterson olefination reaction with carboxylic acid derivatives are rare [1,2]. We have recently found that lithiated diethyl  $\alpha$ -trimethylsilylcrotylphosphonate reacts  $\gamma$ -regioselectively with ethyl formate [3]. We describe here the behavior of similar anion derived from diethyl prenylphosphonate towards some alkyl formates.

## RESULTS

When reacted at  $-70^{\circ}\text{C}$  with various alkyl formates, carbanion 2, quantitatively *in situ* generated from diethyl prenylphosphonate 1, behaves as a Peterson reagent and gives, in very good yield, 1-alkoxy-2-phosphonodienes 3, of exclusive 1-(Z)-geometry. Dienes 3 react with dienophiles, leading to new variously substituted Diels-Alder phosphonoadducts 4, obtained with excellent diastereoselectivity and isolated in very good yield (Scheme).



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