

"The Wittig Reaction: Generation, Observation and Reactivity of a Phosphorous Ylide Intermediate: An Experiment for the Advanced Organic Chemistry Laboratory Course."
Breton, G. W. *Journal of Chemical Education*, 1997, 74, 114-115.

Abstract: During the presentation of reaction mechanisms in an advanced organic chemistry course, the involvement of reactive intermediates is often discussed without offering physical proof of their existence. Laboratory courses provide a venue for the investigation of such species. For example, the Wittig synthesis (eq 1) of 1,1-diphenyl-1-propene (**3**) from ethyltriphenylphosphonium iodide (**1**) and benzophenone requires the generation of phosphorus ylide intermediate **2** via deprotonation of **1**. The existence of the ylide may be inferred by the formation of a deeply colored solution upon deprotonation. However, by running the reaction in an NMR tube, as described below, the ylide may be directly observed by ^1H NMR spectroscopy. Furthermore, since the ylide is generated in $\text{DMSO-}d_6$, a deuterium exchange between the solvent and the ylide at the C-1 position results, yielding **2-D** from initially formed **2-H** (eq 1), so that the final product, **3**, is also deuterium-labeled. This reaction sequence, therefore, illustrates a convenient method for the synthesis of deuterated alkenes.