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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>

Reaction of Trivalent Phosphorus Compounds with Viologens

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Online publication date: 27 October 2010

To cite this Article Yasui, Shinro , Itoh, Kenji , Ohno, Atsuyoshi and Tokitoh, Norihiro(2002) 'Reaction of Trivalent Phosphorus Compounds with Viologens', *Phosphorus, Sulfur, and Silicon and the Related Elements*, 177: 8, 2001 — 2002

To link to this Article: DOI: 10.1080/10426500213358

URL: <http://dx.doi.org/10.1080/10426500213358>

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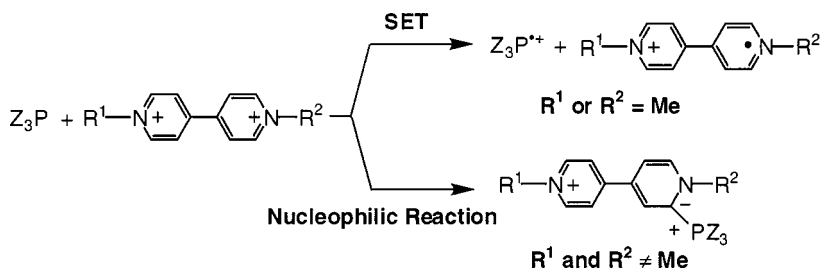
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When trivalent phosphorus compounds (Z_3P) reacted with viologens, either a single-electron transfer (SET) or a polar reaction takes place, depending on the kind of substituents of viologens.

Whereas Z_3P is a nucleophile, Z_3P undergoes single-electron transfer (SET) reaction with electron deficient compounds to generate the corresponding radical cations.^{1,2} We followed the reaction of Z_3P with various viologens in $\text{MeCN}:\text{MeOH} = 1:1$ under an argon atmosphere at 45°C on a UV-vis spectrophotometer. We looked to find if the kind of substituents of viologens determines whether Z_3P undergoes SET to viologen or attacks viologen nucleophilically. Moreover, we observed a considerably large kinetic isotope effect ($k_{\text{H}}/k_{\text{D}} \approx 4.0$) in



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the SET reactions. From these results, SET from Z_3P to viologen takes place via “tight” encounter complex.

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