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

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### The Formation of Ion-Radical Salts in the Reaction of Fullerene C<sub>60</sub> with Phosphorus (III) Amides

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## The Formation of Ion-Radical Salts in the Reaction of Fullerene C<sub>60</sub> with Phosphorus (III) Amides

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*It was shown by ESR, <sup>32</sup>P NMR and UV spectroscopy that fullerene forms ion-radical salts with hexamethyl- and hexaethyltriaminophosphines.*

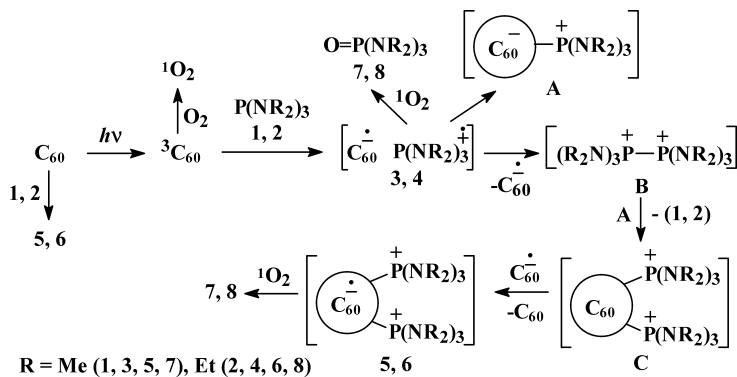
**Keywords** Fullerene; hexaethyltriaminophosphine; hexamethyltriaminophosphine; ion-radical salts

Since the discovery of fullerene C<sub>60</sub> it has been intensively studied as an electron-withdrawing component of donor-acceptor dyads, used for the creation of the molecular devices. It is known that phosphorus donors such as white phosphorus (P<sub>4</sub>) and phosphine oxides<sup>1,2</sup> form the molecular complex with C<sub>60</sub>. The phosphines are easily oxidized in the presence of C<sub>60</sub>. The phosphine complexes with BH<sub>3</sub> add to the fullerene moiety with the formation of the fullerene C<sub>60</sub> acyclic derivatives.<sup>3</sup> Here the results of the study of the fullerene interactions with strong nucleophiles such as hexamethyl- and hexaethyltriaminophosphines **1** and **2** are discussed.

It was shown by means of the electron spin resonance (ESR), NMR <sup>31</sup>P, and UV-spectroscopy that fullerene C<sub>60</sub> forms the ion-radical salts **3** and **4** with phosphites **1** and **2** (Scheme 1). These salts are unstable. First, they are oxidized to amidophosphates **7** and **8**. Second, they undergo the further transformations to the new ion-radical salts **5** and **6**. The triads **5** and **6** are also unstable and gradually convert into diamagnetic compounds **7**, **8** and fullerene oxides. The formation of triads

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**5, 6** supposedly involves the intermediate formation of the strong electrophilic dication **B**.



**SCHEME 1**

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