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

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A NEW HEPTANUCLEAR TIN CLUSTER CONTAINING SULFUR AND OXYGEN  
IN THE FRAMEWORK

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Abstract We have recently reported that new structural forms having the cube,  $(n\text{-BuSn}(\text{O})\text{O}_2\text{PPh}_2)_4$ , and oxygen-capped,  $[(n\text{-BuSn}(\text{OH})\text{O}_2\text{PPh}_2)_3\text{O}][\text{O}_2\text{PPh}_2]$ , formulations can be prepared by the reaction of *n*-butylstannonic acid with the corresponding diorganophosphinic acid. In new work exploring the effects of the bulky mesityl group bound to phosphorus, a cube formulation was also obtained. When *n*-butylstannonic acid was reacted with dicyclohexylphosphinic acid in the presence of nitric acid an oxygen-capped cluster having nitrate as the anion was obtained, demonstrating that the phosphinate anion is not required to stabilize the o-capped cation. In an attempt to generate similar structural forms, with sulfur replacing oxygen in the framework, the reaction of *n*-butylstannonic acid with diphenylphosphine oxide in the presence of elemental sulfur has been explored. From this reaction, a new structural form, containing seven hexacoordinate tin atoms and incorporating sulfur into the framework,  $[(n\text{-BuSn}(\text{S})\text{O}_2\text{PPh}_2)_3\text{O}]_2\text{Sn}$ , was obtained in a mixture of products. A comparison of the crystal structures of the three compounds indicates that the new form has structural features in common with both the cube and the o-capped cluster.