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Solid Sulfur Allotropes

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Abstract Sulfur is the element with the largest number of solid allotropes. Most of these consist of unbranched cyclic molecules with ring sizes ranging from 6 to 20. In addition, polymeric allotropes are known which are believed to consist of chains in a random coil or helical conformation. Furthermore, several high-pressure allotropes have been characterized. In this chapter the preparation, crystal structures, physical properties and analysis of these allotropes are discussed. Ab initio MO calculations revealed the existence of isomeric sulfur rings with partly rather unusual structures at high temperatures.

Keywords Sulfur homocycles · Sulfur chains · Polymerization · Physical properties · High-pressure allotropes · Crystal structures

List of Abbreviations

DAC	Diamond anvil cell
DSC	Differential scanning calorimetry
MD	Molecular dynamics
S_μ	Polymeric sulfur usually prepared from quenched liquid sulfur
STP	Standard temperature and pressure conditions