The gel technique has been employed to grow single crystals of ZnS. ZnCl₂ and ZnBr₂ are used as zinc ion donors while organic sulphur compounds are used as sulphide ion donors. The experimental conditions favoring the growth of ZnS crystals in gel, the effect of different sulphide ion donors and other experimental parameters such as reactant concentrations, pH value, etc. on the gel growth of ZnS have been investigated and discussed.

Key words: ZnS, gel growth, crystallization apparatus, growth mechanism, dislocations.

Introduction

Some metal sulphides are of potential importance as semiconductors, luminescent materials and piezoelectrics. The presence of polytypism and polymorphism as well as the contamination from crucibles make the high temperature growth of good quality crystals difficult. Growth of such crystals at room temperature would be advantageous from the point of view of elimination of morphological transformations and structural defects. Although attempts to
grow some of the sulphide group of crystals in gel have recently been reported (1-3), the up-to-date literature shows no effort made for the growth of ZnS. Aiming specifically at growing less defective crystals of zinc sulphide at ambient temperatures the gel method has been used by the authors and the results obtained are described in this communication.

**Experimental**

Although the basic principle involved in various gel crystallization apparatus (4,5) is primarily the same, the single as well as double tube systems were used in our experimental investigations since a great deal of lateral diffusion of ions to growth sites is rendered possible in these systems. The single tube system (Figure 1) which is more stable, however, was preferred, thus avoiding the risk of disruption of the gel during the growth experiments. The chemicals used were all of M/s Riedel de Haen, Germany, (Analar Grade) except sodium silicate and the acid which were commercial grade.

Our investigations have proved that a gel medium set with hydrochloric acid provides most favorable growth conditions for ZnS. As-available commercial grade sodium silicate was dissolved in distilled water to give a resulting specific gravity of 1.06 to which was then added the

![Experimental set up for the growth of ZnS in a gel.](image)