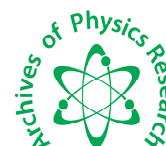




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### Growth and EDAX of mixed Ca-Ba Tartrate

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#### ABSTRACT

Mixed crystals of Calcium-Barium Tartrate were grown by a single diffusion method. The optimum conditions were established by varying various parameters such as pH of gel solution, gel concentrations, gel setting time, concentration of reactants etc. Crystals having different morphologies were obtained. Whitish semitransparent, pale yellow, rhombohedral shaped, needle shaped crystals of Calcium-Barium tartrate were obtained. Some of them were transparent diamond shaped, some are twined. Maximum sizes of the grown crystals are 5mm×3mm and thickness about 2to3mm. The crystals grown were characterized by X-ray powder diffractometry and Energy Dispersive Analysis by X-rays (EDAX). The results of these observations are described and discussed.

**Keywords:** Gel technique, Mixed Ca-Ba tartrate Crystals, EDAX

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#### INTRODUCTION

Most of the tartrate compounds are insoluble in water and decompose before melting. Hence single crystals of such type of compounds cannot be grown by either slow evaporation or melt technique. In this situation gel method is the appropriate one for their growth. The growth of single crystals of Calcium tartrate was reported (1), single crystals of Strontium tartrate was reported (2). Thermal studies on tartrate crystals grow by gel method were reported by many investigators(3-5). Thermal behavior of Strontium tartrate was reported(2). Number of researchers have been utilized the gel technique in various manner to grow Crystals of different materials (6-10). Mixed Crystals of tartrate have several applications in medicine, optics etc. and hence, it was thought worthwhile to undertake investigation on growth of crystals of mixed tartrate and their characterization by different methods.

In the present paper we reported the growth of mixed single crystals of Calcium Barium tartrate grown in silica gel. These crystals are identified and characterized by different method.

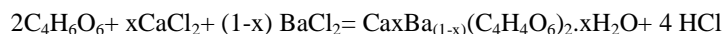
#### MATERIALS AND METHODS

The growth of rare-earth tartrate crystals was achieved by using gel encapsulation technique (6). The Crystallization apparatus for the growth of Calcium Barium Tartrate Crystals consist of borosilicate glass tube of length 20cm and diameter 2.5cm placed vertically on plastic stand. . The silica gel was used as a growth media.

Gel was prepared by using tartaric acid, Sodium meta silicate having different pH values. The chemicals used for growth mixed tartrate were  $C_4H_6O_6$ ,  $CaCl_2$ ,  $BaCl_2$ ,  $Na_2SiO_3$ , All chemicals were AR grade.

Different molar masses were tried to determine optimum growth conditions. One of the reactants having different concentrations was incorporated in to the gel. This solution was then transferred to several glass tubes. The test tubes were sealed with cotton to prevent fast evaporation and contamination of the exposed surface of the gel. After setting of the gel it was left for aging for different periods of time. Other reactants' having different concentrations was then added as supernatant over the set gel. Experiments were carried out by changing different concentrations of the reactants.

The chemical reaction inside the gel can be expressed as



The systematic growth experiments were performed by adding  $CaCl_2$ ,  $BaCl_2$  as feed solution of strength varying from 0.2 M to 1.2M over the set gel of pH range 4 to 4.5 and gel density range  $1.02 \text{ gm/cm}^3$  to  $1.05 \text{ gm/cm}^3$ .

### 3. Observations:

In the present work prismatic semitransparent crystals of Calcium barium tartrate inside the test tube and a few pale yellowish, semi transparent, some are whitish, rhombohedral shaped, at one end crystals are translucent were observed as shown in fig.1(a) and (b).



Figure 1 (a)



Figure1(b)

Figure 1. (a) Prismatic Semitransparent Crystals of Calcium Barium Tartrate inside the test tube Figure 1. (b) Pale yellowish, some are Whitish prismatic semi transparent crystals of Calcium Barium Tartrate.

### 4. CHARACTERIZATION:

Calcium Barium Tartrate crystals were characterized by EDAX.

#### Energy Dispersive Analysis by X-rays (EDAX):

Energy Dispersive analysis by X-rays (EDAX) is used for the quantitative analysis and is also called as elemental analysis. In the present work elemental analysis of gel grown calcium barium tartrate crystals was carried out at the National chemical laboratory pune. Figure 2. Shows EDAX Spectrum of calcium barium tartrate.

EDAX-Carried out standard less at 30KV energy showed the following results for the given sample of calcium barium tartrate crystals. The peak ranging from 3.7KeV to 3.9KeV clearly indicates the presence of calcium in the sample it also gives the 2050 counts per second. Characteristic peaks of the calcium appear in between the 3.5KeV to 4KeV. The relative concentration of the calcium is observed 86.41%.

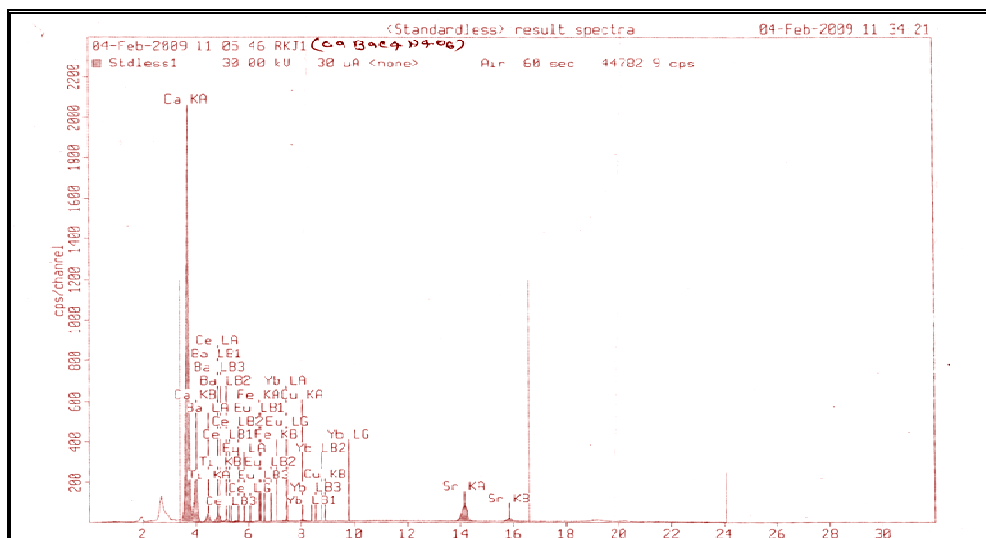


Figure 2. EDAX Spectrum of Calcium Barium Tartrate

The peak ranging from 4.0KeV to 4.2KeV is showing presence of barium in the sample it is giving 535counts per second. The relative concentration of the barium is 11.2%.All these observation after analyzing the EDAX leads to the conclusion that the sample crystal shows presence of calcium and barium.

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