

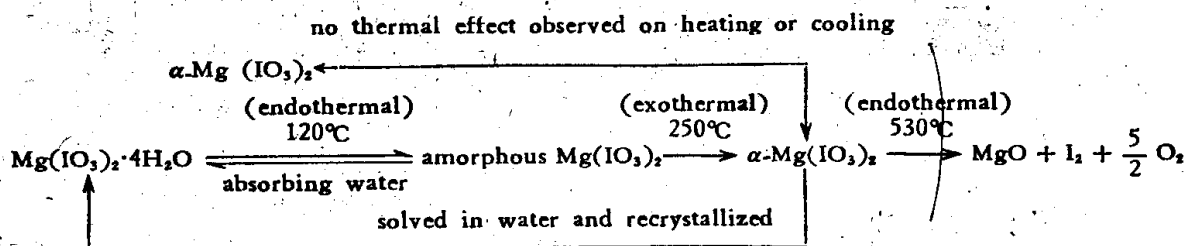
# THE STRUCTURE AND PHASE TRANSITIONS OF MAGNESIUM IODATE CRYSTALS

LIANG JING-KUI YU YU-DE DING SHI-LING

(Institute of Physics, Academia Sinica)

## ABSTRACT

The phase transitions of  $\text{Mg}(\text{IO}_3)_2 \cdot 4\text{H}_2\text{O}$  crystals in the heating process have been investigated by means of thermal analyses and X-ray diffraction at high and room temperatures. The results may be exhibited in the following diagram:



The crystal structure of  $\text{Mg}(\text{IO}_3)_2 \cdot 4\text{H}_2\text{O}$  has been determined by means of the method of single crystal diffraction, it has been found that the space group of  $\text{Mg}(\text{IO}_3)_2 \cdot 4\text{H}_2\text{O}$  is P2 or Pm. There are two formula units per unit cell. Lattice parameters are:  $a = 8.307\text{\AA}$ ,  $b = 6.627\text{\AA}$ ,  $c = 8.541\text{\AA}$ ,  $\beta = 100^\circ 45'$ .

The crystal structure of  $\alpha\text{-Mg}(\text{IO}_3)_2$  has been determined by X-ray powder method. The unit cell of  $\alpha\text{-Mg}(\text{IO}_3)_2$  is hexagonal, with  $a = 5.4777\text{\AA}$ ,  $c = 5.1282\text{\AA}$ ,  $c/a = 0.9362$  at  $14^\circ\text{C}$ . There is one formula unit per unit cell. The space group is  $\text{P6}_3\text{6O}^{\text{II}}$ .  $6\text{O}^{\text{II}}$  are situated at the  $6(c)$  positions,  $2\text{I}^{\text{V}}$  are situated at  $2(b)$  positions, and  $\text{Mg}^{++}$ -ion is disorderly distributed at half of  $2(a)$  positions, the atomic parameters being  $X_c = 0.096$ ,  $Y_c = 0.344$ ,  $Z_c = 0.162$ ,  $Z_b = 0$ ,  $Z_a = 0.981$ . The crystal structure of  $\alpha\text{-Mg}(\text{IO}_3)_2$  is isomorphic with  $\alpha\text{-LiIO}_3$ .  $\alpha\text{-Mg}(\text{IO}_3)_2$  is different from  $\alpha\text{-LiIO}_3$  only in that the  $\text{Mg}^{++}$ -ion is disorderly distributed at one-half of  $2(a)$  positions and the other half is vacant.