

49

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THE CRYSTAL STRUCTURE OF HYDROGEN IODIDE AND ITS RELATION WITH THAT OF XENON

Using the apparatus already described (see *NATURE*, Mar. 22, vol. 125, p. 457; *Rend. Acc. Lincei*, vol. 11, p. 679), I was able to obtain good photographs of crystalline hydrogen iodide at about -170° C. An iron anticathode was used. The lines correspond to a face-centred cubic structure with lattice constant $a = 6.18$ A. The cell contains 4 molecules hydrogen iodide; the calculated density is 3.59.

It is remarkable that the lattice constant of hydrogen iodide is practically identical with that of xenon as found by A. G. Nasini and myself (*NATURE*, Mar. 22). This confirms what we then pointed out, namely, that the ionic radius of I^{-} is identical or very near to the atomic radius of Xe, which was then calculated to be $= 2.18$ A.

From our present determinations we deduce for I^{-} the same value, while from the metallic iodides Goldschmidt (*Geochem. Verteilungsgesetze d. Elem.*, *Norsk. Vid. Ak.*, 7; 1926) found 2.20 A. in very good agreement with ours. The dimensions of the HI-lattice seem to be determined by the I-ions only, since the empty spaces amply suffice for the location of the hydrogen ions, the radius of which is surely less than 0.6 A. (Natta: *Giorn. Chim. Ind. e Appl.*, 12, 36; 1930; *Gazz. Chim. It.*, 58, 356; 1928).

There appears to be a possibility of obtaining solid solutions between xenon and hydrogen iodide, which would be a first instance of a mixed lattice in which neutral atoms alternate with ions.

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