

CCCXCIII.—*Lead Dihydride and Lead Tetrahydride.*

By EDWARD JOSEPH WEEKS.

SOLID hydrides of arsenic (*Chem. News*, 1924, **129**, 31), antimony (this vol., p. 1069), and bismuth (*ibid.*, p. 1799) having been prepared, the existence of a solid lead hydride was investigated. To a solution of alkali plumbite made from lead acetate and caustic soda or potash, pure aluminium foil was added. The grey deposit obtained was washed many times with caustic potash solution and finally with water until the washings were neutral. It was filtered off, and dried in a vacuum desiccator over sulphuric acid for 3—5 days, both operations being performed in an atmosphere of hydrogen. The action follows the equation  $2\text{KHPbO}_2 + 2\text{Al} = 2\text{KAlO}_2 + \text{Pb}_2\text{H}_2$ . The deposit contained lead and hydrogen only, and on heating in a vacuum gave off hydrogen and left metallic lead. Details of the method of analysis have already been given for bismuth (*loc. cit.*). 0.3253 G. gave 20 c.c. of  $\text{H}_2$  measured at *N.T.P.* and 0.3243 g. of

Pb. H, 0.5; Pb, 99.1%. 0.1504 G. gave 10 c.c. of  $H_2$  at *N.T.P.* and 0.1422 g. of Pb. H, 0.6; Pb, 99.5%. On combustion, 1.9550 g. gave 0.0662 g. of  $H_2O$ . H, 0.5% ( $Pb_2H_2$  requires Pb, 99.5; H, 0.5%).

Lead dihydride heated in a tube in the absence of air gave lead and hydrogen only. No trace of  $PbH_4$  appeared to be formed, as no lead deposit could be obtained on heating the issuing gas. The dihydride oxidises rapidly in the air and therefore must be kept in an inert gas. Fused potassium nitrate reacted vigorously with it (as with  $As_2H_2$ ;  $Sb_2H_2$ ;  $Bi_2H_2$ ), but only slowly oxidised finely divided lead.

To obtain the tetrahydride, first prepared by Paneth, the dihydride was heated in a silica tube in an atmosphere of pure hydrogen, and the issuing gas was passed through a heated tube; a deposit of lead was then obtained. With hydrogen alone, no deposit was formed and hence it is concluded that the reduction of  $Pb_2H_2$  follows the equation  $Pb_2H_2 + 3H_2 = 2PbH_4$ .

BATTERSEA GRAMMAR SCHOOL,  
LONDON, S.W. 11.

[Received, November 2nd, 1925.]