GAS-LIQUID PHASE EQUILIBRIUM IN THE SYSTEM
METHANOL-HYDROGEN

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Summary

The liquid-gas phase equilibrium of the binary mixture methanol-hydrogen has been measured at the temperatures 25°, 50°, 75° and 100°C. The pressure ranged from 80–800 atm. The results are tabulated and also given in a diagram.

§ 1. Introduction. The P-t-x relation for the binary mixture methanol-hydrogen has been measured between 80–800 atm. The composition of the liquid phase was measured at 25°, 50°, 75° and 100°C, of the gas phase at 75° and 100°C. No measurements were carried out in the gas phase at 25° and 50°C as the minute methanol content did not allow a proper analysis. The results are tabulated and are also shown in a diagram.

The instrument used has been described in an earlier paper 1). This instrument allows the establishment of phase equilibrium at any desired temperature and pressure in the range under consideration. The equilibrium is not affected when samples are taken for analysis. The analysis of the gas mixture was carried out by absorption of methanol and volumetric determination of the hydrogen.

§ 2. Method of the analysis of the samples. Since a full description of the equilibrium cell and the experimental procedure has been given by Michels, Skelton and Dumoulin 1) the description can here be restricted to the analysis method.

Samples of either of the two phases, when drawn from the equilibrium cell, were passed through a glass tube filled with degassed silica gel where the methanol was completely retained. Weighing
before and after the experiment gave the amount of methanol. The rest of the sample, being pure hydrogen, was led into a calibrated glass flask. From the volume of the flask and the temperature and pressure of the gas the quantity of hydrogen was calculated. Preliminary experiments showed that for a proper absorption of the methanol from the gas phase it was essential to restrict the speed in taking samples to an upper limit of two liters per hour. For the liquid phase this time limit is higher.

§ 3. Results. The results are presented in table I and figs. 1, 2 and 3. The pressures are given in international atmospheres. The com-