PH. D. CHEMISTRY

ARTHUR DOUGLAS GRIEVE

EQUILIBRIA EXISTING IN THREE COMPONENT SYSTEM CALCIUM OXIDE—SULPHUR DIOXIDE—WATER, OVER THE TEMPERATURE RANGE 0° TO 25°.

Previous work done on the system calcium oxide water and on the system calcium oxide—sulphur dioxide—water is discussed.

An apparatus is described by means of which it is possible to bring together in a closed system a gas, a liquid and a solid in a very pure state and at concentrations which can be measured with great precision. With this apparatus it is possible to measure simultaneously the electrical conductivity and the vapour pressure of the solutions prepared. The cell, and stirrer have been designed to insure excellent agitation of the solid phase.

Conductivity and vapour pressure data are presented for saturated solutions of calcium hydroxide over the range 0° to 25° and from an analysis of the data it has been decided that the available data for the solubility of calcium hydroxide over this range are in error and values have been calculated which are believed to be more nearly correct.

Conductivity and vapour pressure data are presented for the system calcium oxide—sulphur dioxide —water over the range 0° to 25°, at calcium oxide concentrations of 1% and 2% and at sulphur dioxide concentrations up to more than five moles per mole of lime. The data obtained are discussed and compared with the corresponding data for the sulphur dioxide-water system.

PH. D. CHEMISTRY

EARLAND G. HALLONQUIST

SYNTHESIS, STRUCTURE AND PROPERTIES OF CYCLIC AND BICYCLIC ACETALS.

Bromoethylidene glycerol has been prepared as a mixture of the isomeric five- and six-membered cyclic acetals. This mixture has been separated into the two isomeric forms, and the identity of each of these established. This work has furnished further information on: (a) ring partition; (b) ring migration; (c) the influence of polar radicles, or atoms, on the ease and nature of acetal condensations involving glycerol.

Two isomeric bicyclic acetal ethers, namely, 3, 5, 7-trioxabicyclo 2, 2, 2 octane and 3, 6, 8-trioxabicyclo 3, 2, 1 octane, have been synthesized by the action of aqueous potassium hydroxide on 1, 3-bromoethylidene glycerol 2-benzoate and 1, 2-bromoethylidene glycerol 3-benzoate respectively. These bicyclic compounds have been studied in relation to the stability, structure and properties of anhydro sugars and polysaccharides, and the normal oxygen valence angle in carbon-oxygen heterocyclic rings.

A new method for the synthesis of cyclic acetals from simple open-chain acetals is described.

PH. D. CHEMISTRY

WILLIAM FORSEY HAMPTON

THE HEAT CAPACITY OF GELATIN GELS.

The heat capacities of gelatin gels, prepared from ash-free gelatin, of concentrations ranging from 9% to 100% gelatin and over the range of temperature between —180° and 25°C., have been measured.

The investigation was undertaken in order to obtain some information concerning the relationship which exists between gelatin and water in gelatin gels.

Certain limitations in the method used by other workers for the calculation of unfrozen or "bound" water in gels from calorimetric data are discussed and a new equation for this purpose is derived. The amount of water remaining unfrozen in a gel is found to be dependent both on the concentration of the gel and the temperature.

The heat capacity of the Monel metal container used for the gels, was determined and an equation is derived for the specific heat of Monel metal between —183° and 25°C.

PH. D. PHYSICS

ROBERT NEWMAN HASLAM

THE STARK EFFECT IN THE ULTRA VIOLET REGION OF THE MERCURY SPECTRUM.

An investigation has been made of the Stark Effect in the region 2200 — 3000Å of the mercury spectrum. By the use of a modified LoSurdo source fields of the order of 80 KV/cm. have been obtained. Plates have been taken with a Hilger E_2 spectrograph and a Hilger E_1 quartz spectrograph.