Two methods have been proposed for manufacturing microspherical alumina, the difference between them consisting in the shaping process. In one of these methods, oil shaping is used for aluminum hydroxide sols obtained by neutralizing solutions of aluminum salts by organic bases [1]; in the other method, mechanical shaping is used, i.e., aluminum hydroxide dried to a specific moisture content is rolled in special (sugar-coating) boilers [2]. Both methods have shortcomings. The first method requires an expensive organic base, for example, urotropine, and the other method is not continuous. The Institute of Petrochemical Synthesis of the Academy of Sciences of the USSR has been carrying out research on the development of manufacture of spherical granules of alumina and alumina catalysts from pseudosols of aluminum hydroxide. One version is the manufacture of microspherical alumina by spray drying of pseudosols. Below we give the results of the development of such a method in the laboratory.

Microspherical alumina was obtained in parallel from hydroxide specimens, obtained by carbonization of aluminate solutions, and by precipitation from a 4 N aluminum sulfate solution with a caustic soda solution (Table 1). In both cases the washed aluminum hydroxide was peptized by addition of hydrochloric acid (0.15 mole of HCl per mole of Al₂O₃). This converted the precipitate to a liquid, viscous state, suitable for spray drying. The properties of such pseudosols are described in detail in [3]. Despite the markedly thixotropic properties at a content of 0.1 to 0.3 mole HCl per mole of Al₂O₃, the viscosities of these pseudosols are sufficient to exclude solidification in the pipes and capillaries of the spray drier for at least 20 min. After peptization, the pseudosol was filtered through gauze and then atomized in the spray drier (Fig. 1). The laboratory apparatus consisted of three main units: an atomizing chamber 1 of height 1.5 m and diameter 0.4 m with a conical bottom, heated by an electric furnace; an air preheater 2 and an atomizer 3 consisting of a cylinder with a piston and jet. The temperatures of the atomizing chamber and the hot air fed from the air preheated were controlled automatically.

To determine the optimum spray drying conditions, experiments were performed at 100-350°C. At 100-150°C we obtained a large amount (up to 48%) of +200 μ particles consisting of several adhering granules. At 250 to 350°C the yield of the target fraction of microspherical alumina with particle diameters of 40-200 μ rose to 88%. This is evidently the optimum drying temperature for such particles because it is adequate for rapid solidification of the drops of atomized pseudosol. In subsequent experiments the temperature in the atomizing chamber was kept at 250°C.

After the product had been dried and roasted for 4 h at 650°C, we determined the bulk density of the microspherical alumina and its mechanical strength by a method developed in The Grozny Petroleum Scientific Research Institute (GrozNII) [4]. To obtain comparative data, from most of the aluminum hydroxide specimens we obtained (in parallel with spray drying) shaped microspherical alumina by rolling in the special boiler [2] and pellets of the material by hand rolling.

The experiments showed that spray drying of pseudosols gives microspherical alumina and therefore alumina-based catalysts of high strength from both reprecipitated and carbonized hydroxide (Table 1). In view of the good prospects of making aluminum hydroxide by carbonization of...
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**Note:** Specimens 1-13 were obtained by carbonization, and specimens 14 and 15 by reprecipitation.