NUMERICAL MODELING OF AIR COOLING OF CONTAINERS FOR DESUBLIMATION OF FLUORINE HYDROGEN

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A condensation-evaporation plant is an element of production for the separation of uranium isotopes. The main components of the resulting mixtures are UF_6, hydrogen fluoride (HF), air components and other non-condensable impurities.The method used to separate the gas mixture consists in the movement of the gas mixture through a series of special thermostattedcontainers, the cooling regime of which differs in temperature.In this case, desublimation of UF_6 and HF occurs in different containers.To cool the containers, liquid nitrogen is used to condense HF.It was shown in [1] that the temperature of the cold air of the BXM-0.56/0.6-H air cooler can reach 130-140 K.To simulate the possibility of using air cooling of containers for HF desublimation, modeling of several containers cooling was carried out (Fig. 1).

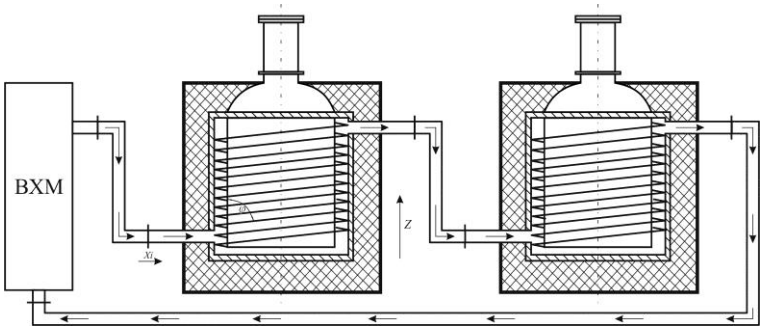

Figure 1.The scheme of two containers cooling.

A physico-mathematical model of the flow of cold air in a branched network of pipelines and heat exchange of several containers during the condensation of the product is developed. Hydrogen fluoride is considered fs the condensation product. The dependence of the saturated vapor pressure on temperature for HF is taken from [2].The intensity of heat release in connection with the condensation of HF is taken from [3].An algorithm and a computer program have been developed that realize the calculation of the air flow parameters in a branched pipeline network for transporting cold air to the containers.Numerical simulation of the processes of containers - air heat exchange taking into account the air flow characteristics of BXM-0.56/0.6-H, heat exchange with the environment and technological flows into the tank is carried out.The analysis results of heat transfer calculation during containercooling have shown that the powerof one-BXM-0.56/0.6-H is enough for thermostatting six containers.

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References

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