STUDY OF THE OXYGEN ABSORPTION IN WATER SOLUTIONS USING INNOVATIVE HEAT AND MASS EQUIPMENT

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The aim of the work is to study the process of oxygen absorption in water by sulfite method in the experimental setup with rotor-pulsating apparatus with a different arrangement of jet units and determination of the aeration efficiency.

Results

The experimental aeration setup is combined with mechanical and jet aeration method and includes an aerator-oxidizer, which is a rotor-pulsating apparatus and water-air ejectors, one at the inlet of the rotor-pulsating apparatus, the other - at the outlet. The setup design allows conducting aeration with each ejector separately. Hydraulic and energy characteristics of the setup were determined for each of the two schemes.

The aeration efficiency in both schemes is based on the use of chemical oxidation of sodium sulfite which is a part of the water model solution by air`s oxygen feeding the setup.

All experiments were carried out under the following initial conditions: the volume of liquid was 10 L; the concentration of sodium sulfite was 10…15 g/L, temperature 15^{o}C. Samples were taken every 5 minutes in 20 minutes.

Experiments were performed for angular velocity of rotor unit of 38.2, 43.00 and 47.75 rps. During the experiments, the catalyst was not used.

Based on the data obtained, plots of the concentration of sodium sulfide from the processing time were made. The obtained curve by the least squares method is approximated in the straight line. The oxygen mass transfer rate (sulfite number) is defined as the tangent of the angle of inclination of this line to the axis of abscissa.

Conclusions

The installation of an ejector at the inlet of the RPA at the aeration of aqueous solutions showed a higher oxygen mass transfer rate, at lower energy consumptions for aeration and mixing of the water-air mixture.