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Carbonization of a soda solution in rotary disc reactors

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Abstract

There are in the present work the results of experimental researchers of chemical transformations in liquid-gas systems for example a reaction of receiving cleared bicarbonate of soda at saturation of the soda solution by carbon dioxide. As the reactionary devices it is suggested to use rotor-disc mixers, which consist of the alternates rotates and unmovable discs with perforations and additional elements. To the body of the rotor-disc reactor were established four sets of movable and unmovable discs of different constructions. The first set is consist of the smooth periphery discs. The holes are placed so that during rotation of the rotor they are coincides alternately and overlaps with the holes of the movable disc. The process environment, passing through the working volume of the device is undergoes to intensive mechanical and a hydrodynamic influence from the working bodies side. The second set is consist of two fixed discs with located by periphery holes of one movable disc with the holes arranged at the center of the disc. On the bottom side of the top fixed disc, on the top side of the bottom fixed disc and on the both sides of the movable disc are additional working bodies in the form of the teeth of rectangular section radially welded to the discs. The third set is different of the second by availability of the slots by length of the tooth in distance from his base equal to the height. The fourth set is consist of the smooth fixed discs with holes and placed between they of movable disc with the holes arranged in the center and radially arranged teeth and besides the slots on fixed discs are repeat the form and arrangement of teeth on movable disc. It is determined a changing of the end product (bicarbonate of sodium) concentration in depending on processing time in rotor-disk mixers equipped by movable and fixed disks of different construction. It is showed that a rotor-disk mixers, disks of which has the biggest area of perforation surface and additional elements has the biggest efficiency. It is established that at increasing of this coefficient, the time of processing with degree index ~0.32 is decrease. The same coefficient of efficiency increase is present also during the chemical inversions in liquid-liquid systems.

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