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THE INDUSTRIAL CATALYSTS ENLARGED TESTS RESULTS IN THE BUTYNEDIOL-1,4 HYDROGENATION PROCESS

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Publication is devoted to carrying out of the butindiol-1,4 hydrogenation process enlarged tests. Results of the enlarged tests have shown that the process selectivity and product cleanness raises at use of alloy catalyst SKN-39 in the process of butindiol-1,4 hydrogenation. The tests have shown that the butanol exit grows much more slowly, i.e. from 2,3 up to 8,0% at work with alloy catalyst SKN-39. Comparing the data of alloy catalyst SKN-39 to industrial catalyst MNH advantage of the first catalyst is obviously observed. Their application in production allows to increase selectivity of process on butandiol by 18–27%, and stability in 1,5–2 times. SKN-39 catalyst possesses higher hydrogenating ability than industrial MHX. The productivity of process raises in 1,5–2,0 times, selectivity raises by 15–30%, and the target product possesses higher quality at the butindiol hydrogenation on the SKN-39 catalyst.

Keywords: butindiol-1,4, butandiol-1,4, nickel catalysts

The butynediol-1,4 hydrogenation kinetic regulations study is very significant in the practical relations, as, especially, this reaction has already been laid in the basis of the butanediol-1,4 obtaining industrial process.

So, it should quite necessary to be developed and to be implemented the most efficient and the most stable catalysts for the organic synthesis in the production for the modern production development. The high – performance steady – state and the stationary catalysts development for the hydrogenation process at the modern requirements level in the industry is the most significant, while, at the same time, it is the complex technical challenge, the final solution of which is resulted in the butanediol-1,4 increase in its yield and, in general, its obtaining process efficiency. That is why, it should be necessary the highly – efficiently catalysts, due to the special requirements just to the obtained substances purity for this process carrying out [1–3]. In this connection, the butindiol hydrogenation process study on the modified nickel catalysts is the most actual and relevant [4–6].

So, the laboratory researches have been shown, that, developed by us, the SKN-39 alloyed catalyst is displayed the highest activity, its selectivity, and its stability, and the MNX and the NX industrial catalysts – the smallest ones at the butindiol-1,4 hydrogenation NX [4]. At present, the SNK-39 from the alloyed catalyst has its industrial applications in a number of the hydrogenation processes, such as the oil aldehydes hydrogenation and the others. In this connection, the catalytic properties on the pilot installation have already been investigated by us, for the SKN-39 alloyed catalyst early introduction, which is also the highly – efficient catalyst in the butindiol-1,4 hydrogenation process. Thus, the MNX, NX, and SKN-39 catalysts enlarged and the integrated testing final results have already been given in the Tables 1–3.

Table 1

The MNX Various Catalysts Enlarged Tests Results, in the Butindiol-1,4 Hydrogenation Process. The Test Conditions: The Raw Materials Volume Flow Rate – 1 l./h., the Hydrogen Flow – 3 NM/h, pH – 7,0 – 9,...

The tests duration, h	The reactor temperature, t, °C	The weight hour space velocity h^{-1}	The hydrogen flow, nm^3/h	The BID concentration in charge stock, %	The hydrogenation products composition, %					The initial BID product yield, % mass	
					Butanol	OMA	BAD	BED	BID	Butanol	BAD
24	90	0,8	0,2	16,9	1,20	abs.	12,6	0,23	trace	7,1	74,8
80	90	0,8	0,2	16,9	1,65	abs.	11,3	0,27	0,10	9,8	66,9
160	90	0,8	0,2	16,9	2,17	0,31	11,5	0,13	abs.	12,9	68,4
200	90	0,8	0,2	16,9	1,97	0,47	11,3	0,2	abs.	11,7	68,4