

ONE-STAGE PRODUCTION OF HYDROGEN WITHIN LIQUID AND HIGH TEMPERATURE HEAT-TRANSFER MEDIUM

Authors: Hlikin M.A., Tarasov V.Yu.

Background of new technology decision search of hydrogen production in chemical industry

- raising prices of crude oil, natural gas and energy carriers
- the necessity to increase the completeness of raw material processing
- multistage way and difficulties of modern processes of natural gas conversion
- decreasing energy expenses
- high expenses for new heterogeneous catalysts production and equipment for high temperature gas-phases processes
- costs dealt with buying licenses of foreign technologies process.

Study of hydrocarbons processing within liquid and high temperature heat-transfer medium

The best results achieved

- One-stage production of hydrogen and decrease of costs for construction and exploitation
- Degree of natural gas conversion into hydrogen and carbon within sodium chloride melt is 100%
- 10-100 times reactor volume reducing
- The possibility and advisability of producing hydrogen from fuel gases of oil refining
- Maintaining constant high heat and energy stressed surface of phase contact

Technology and fuel (raw materials))	Power 1000 Kg/day	capital costs		Factor of power (%)	Hydrogen production costs (\$ for 1 Kg of H ₂)			
		MLN \$	for 1000 Kg/day		Capital	Of raw materials	Operational	Total
Pyrolysis of NG	379,387	\$200	\$530	90	\$0,20	\$1,80	\$0,25	\$2,25
Conversion of NG	379,387	\$288,3	\$760	90	\$0,40	\$1,72	\$0,51	\$2,63
Gasification of Coal	283,830	\$436	\$1,536	90	\$0,57	\$0,56	\$0,09	\$1,21
Gasification of biomass	155,236	\$155	\$998	90	\$0,37	\$0,52	\$0,55	\$1,44
Electrolysis	1,500	\$2,74	\$1,827	70	\$0,96	\$5,06	\$0,73	\$6,75
Nuclear thermochemistry	1200,000	\$2,468	\$2,057	90	\$0,76	\$0,20	\$0,43	\$1,39