

Development of small-scale facility components for hydrogen production in the thermochemical methane-methanol cycle

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Of known and now available methods for production of hydrogen thermochemical cycles, in the first place and, in particular, the methane-methanol cycle, are of most interest. They make it possible to produce hydrogen from water at minimum expenditures of hydrocarbon material.

The essence of thermochemical cycles is that the sequence of intermediate reactions, whose final outcome is the reaction $2\text{H}_2\text{O}=2\text{H}_2+\text{O}_2$, should be selected, and the intervening reagents recover their initial state.

A reduction in methane consumption in the methane-methanol cycle in the course of the hydrogen production out of water is defined by technological perfection of principal processes of the closed thermochemical cycle:

- vapor-oxygen conversion of methane with the output of commodity hydrogen;
- synthesis of methanol out of carbon monoxide and the remaining hydrogen;
- production of methane through electrolysis of methanol for closing of the cycle

with the output of commodity oxygen.

A demonstration small-scale facility for production of hydrogen in the thermochemical methane-methanol cycle on a basis of thermochemical reactions is being created at KeRC. By now, the bench has been equipped and adjustment of main aggregates:

- small-scale tricomponent high-productive generator of synthesis-gas and hydrogen;
- synthesizer of methanol out of synthesis-gas has been carried out

has been carried out.

References

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