

# PROJECT OF RESEARCH AND COMMERCIAL PLANT FOR WASTES DISPOSAL OF ORGANIC CHEMICAL INDUSTRY AND OIL REFINERY BY AEROSOL NANOCATALYSIS TECHNOLOGY

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## **Basic characteristics, essence of the development.**

There was developed a project of research plant for deep industrial wastes disposal by their oxidation to thermodynamically stable harmless products in aerosol of catalyst nanoparticles. Neutralization products get into the atmosphere only in their natural state, and the heat obtained as a result of reactions can be used to heat the coolant. In the research plant, heat is utilized only in amount sufficient to ensure operation of the plant.

## **Patentable and competitive results.**

There was obtained the RF patent №2357796 Method and Reactor for Gas-Phase Chemical Processes by Aerosol Nanocatalysis / Hlikin M.A., Hlikina I.M., Popova L.V., Prin E.M. - appl. 27.10.2005. - publ. 10.06.2009. - Bull. №16.

There was obtained a number of utility model patents of Ukraine:

Ukraine patent for utility model №38375, IPC S01I7/01 Method of Processing Liquid Organochlorine Compounds / Hlikin M.A., Hlikina I.M., Baranova L.A., Kudriavtsev S.O. - appl. 18.09.2008, publ. 12.01.2009, Bull. №1. - 6 p.;

Ukraine patent for utility model №66410, IPC S07S 1/04 (2006.01) Method of Hydrocarbons C5+ Manufacturing / Hlikin M.A., Hlikina I.M., Shershnov S.A., Zhytnytskyi A.L. - appl. 31.10.2011, publ. 26.12.2011, Bull. №24. - 6 p.;

Patent for utility model №70092 Method of Vacuum Gas Oil Processing / Hlikina I.M., Zhytnytskyi O.L., Kashchiev O.S., Hlikin M.A., Kudriavtsev S. O. - appl. 21.11.2011, publ. 25.05.2012 Bull №10, 6 p.;

The research results are published in many scientific and technical journals of Ukraine and world value. There is also a monograph: Hlikin M.A. Heterogeneous Gas-Phase Aerosol Catalysis // M.A. Hlikin, I.M. Hlikina. - Kharkiv: Publishing House "Pidruchnyk NTU KPI", 2015. - 472 p.

## **Comparison with world analogues.**

Alternative technologies for carrying out catalytic oxidation of industrial wastes (if they include solid impurities and catalytic poisons) do not exist. Industrial wastes are disposed in other ways, including burning, which is not an environmentally friendly process.

## **Economic attractiveness of the development for market promotion, implementation, parameters, price.**

Savings of annual costs during processing of 1 ton of wastes using the AnC technology compared with the combustion method will amount to ~70%. The studies showed that catalyst consumption is reduced by  $10^3$  times, at the same time the speed of obtaining the final product decreases by  $10^4$ - $10^6$  times. The reactor extent is also reduced by  $10^3$  times compared with the combustion furnace.

## **Branches, ministries, departments, enterprises and organizations where the development results are going to be implemented.**

The development may be used for oil refinery, chemical, food and household goods manufacturing.

## **Development readiness level.**

Basic design - 100% detailed documentation - 100%, reactor - 100%, detailed design – without georeferencing. If a potential buyer is found, the project and construction will be completed within 12 months. The project can be upgraded to correspond to any type of industrial wastes, which have an organic component, within 6 months.

There was made a detailed design for creation of a mobile plant for wastes disposal of oil and chemical industries.

