

## Green Technologies Developed by JSC “NIUIF”

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**Abstract :** In the recent years, Samoilov Research Institute for Mineral Fertilizers JSC “NIUIF”, the oldest (established in September 1919) industry-oriented institute in Russia, has developed a range of sustainable, environment-friendly, zero-waste technologies that ensure minimal consumption of materials and energy resources and fully consistent with the principles of Green Chemistry that include: - Ecofriendly energy and resource saving technology of sulfuric acid from sulfur according to DC-DA scheme (double conversion - double absorption); - Improved zero-waste technology of wet phosphoric acid (WPA) by dihydrate-hemihydrate process applicable to various types of phosphate raw materials; - Flexible, efficient, zero-waste, universal technology of NP / NPS / NPK / NPKS fertilizers with maximum heat recovery from chemical processes; - Novel, zero-waste, no-analogue technology of granular PK / PKS / NPKS fertilizers with controlled dissolution rate and nutrient supply into the soil, which allows to process a number of wastes and by-products; - Innovative resource-saving joint processing of wastes from the production of phosphogypsum and fluorosilicic acid (FSA) into ammonium sulfate with simultaneous neutralization of fluoride compounds with no lime used. - New fertilizer technology of increased environmental and agrochemical efficiency (currently under development). All listed green technologies are patented with Russian and Eurasian patents. The development of ecofriendly, safe, green technologies is ongoing in JSC “NIUIF”.

**Keywords :** NPKS fertilizers, FSA, sulfuric acid, WPA

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