Adaptation of plasma technologies for hazardous and nuclear waste processing

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The CEA develops for several years different kind of process in order to treat nuclear wastes. It has appeared that some of them could be used to destroy other industrial hazardous wastes such as organo-halogenated liquids or others, largely used as precursor in chemical industry. These processes have the particularity to involved plasma tools in order to reach very high temperature level leading to get very good destruction efficiencies. Thermal and UV photoactivity of the plasma can be simultaneously used to reach the best results. The present paper provides the description of three different thermal processes developed at the CEA to treat radioactive liquid waste: the SHIVA process using bipolar twin torches that involve transferred arc plasma. The IDOHL process involving inductive coupled plasma torch and the ELIPSE process working with an underwater blown arc plasma torch. An additional technology will be presented: The one using cold plasma as corona pulsed discharges in order to design very efficient and enduring filtering system. These systems are intrinsic and in dissociable of very safe and reliable processing. The studies performed on semi industrial or on industrial mockup provide very attractive results showing that these processes could be applied for different kind of waste, nuclear or not. Example of plasma application – The ELIPSE process (submerged plasma process for pure organic liquid treatment)

Biography

Florent Lemont is head of innovative processes laboratory, he has experience in processes and high temperature chemistry at French Atomic Energy Commission CEA. He worked as supervise research (HDR) in the year 2007 in the materials and process engineering department. He is the head of innovative processes laboratory – French Atomic Energy Commission. He is expert in the field of processes and high temperature chemistry. He is the teacher at the Engineering school of Albi, master of science of Pau, master of science of Marseille he is the member of "Program Advisory committee" of international conference on thermal treatment technologies and hazardous waste combustor, member of scientific committee of international conference on engineering for waste and biomass valorization, member of scientific committee of SFGP, scientific advisor CIRP (Taiyuan – Chine).

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