REGENERATION OF ACTIVATED CARBON FIBERS AND GRAINS USING AN IN-SITU ELECTROCHEMICAL PROCESS

A new efficient system based on electrochemical reactions has been developed for in-situ regeneration of activated carbon and degradation of organic pollutants.

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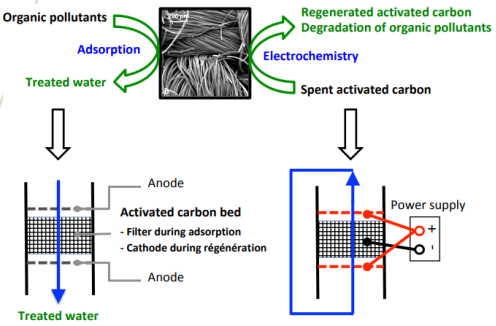
PRESENTATION

The development of efficient water filtration systems is an important challenge for environmental engineering. Activated carbon is widely used for the adsorption of organic pollutants, such as pesticides, pharmaceutical by-products and volatile organic compounds. However, it is only a separation step and the regeneration processes of the adsorption material currently present some important drawbacks. A new electrochemical process for in-situ regeneration of activated carbon has been developed. Both adsorption and regeneration steps are performed in the same reactor. The objective of electrochemical regeneration is to recover the adsorption capacity of the adsorption material and to degrade organic pollutants. The technology was initially developed using activated carbon fibers, a breakthrough material allowing faster adsorption of organic pollutants. The technology is also applied for the regeneration of conventional activated carbon grains.



Water and wastewater treatment – Activated carbon regeneration
Fibers – Grains – Electrochemistry – Anodic oxidation
Degradation and mineralization of organic pollutants

APPLICATIONS

- Industrial wastewater
- Municipal wastewater
- Local tap water points of use

DEVELOPMENT PHASE

- Implementation of a continuous column reactor with activated carbon fibers or grains allows both filtration and regeneration steps with a flow rate of treated water of a few dozens of liters per day
- TRL 4

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INTELLECTUAL PROPERTY

- Device For Regenerating Activated Carbon (FR1852190A ; EP19709917.9A; PCT/EP2019/055803 ; US16/980,584 ; US20210053027A1)
- Reactor allowing the continuous filtration of liquid flowing through a filter with in situ electrochemical regeneration of the filter (EP22154591.6A ; US17/592,692 ; US20220250942A1)

COMPETITIVE ADVANTAGES

- Cost-effective solution by reducing logistical efforts thanks to in-situ regeneration of activated carbon
- Reducing the consumption of activated carbon with up to 10 regeneration cycles
- Reducing the carbon footprint for the filtration phase : lower energy consumption for regeneration and a reduction in the amount of activated carbon implemented
- Compact, robust and easy to process
  Degradation and mineralization of desorbed organic pollutants
- Promoting the activated carbon fibers as an efficient adsorption process, performing better than grains