Fiber and carbon materials for wastewater purification from petroleum products

Natalia Politaeva[a,*], Yulia Smyatskaya[a], Alexander Fedyukhin[b]

[a]*Civil Engineering Institute, Saint Petersburg State Polytechnical University named after Peter the Great, 119021, Novorossiyskaya 48-50, St. Petersburg, Russia, emails: politaevana1971@gmail.com (N. Politaeva), makarovayulia169@mail.ru (Y. Smyatskaya)*
[b]*National Research University, Moscow Power Engineering Institute, 111250, Krasnokazarmennaya 14, Moscow, Russia, email: FedyukhinAV@yandex.ru*

ABSTRACT

This article considers sorbents from waste-based materials that can be used for the absorption of petroleum products (PP). The articles considering sorbents based on hydrophobic expanded perlite, carbonized coal, carbonate sludge from chemical water treatment water are discussed. The work on the use of multicomponent adsorption filters and sorption materials based on modified bentonite is presented. Some types of fibrous sorbents used for wastewater treatment are given. In the experimental part of the work, the possibility of using thermally expanded graphite (TEG) and materials based on it (TEG initial, TEG granulated; coarse-cut foil; finely cut foil) for purification of wastewater from PP was studied. Investigation of their sorption properties showed that the maximum efficiency of wastewater purification from PP is achieved when using TEG. A filter based on TEG and polyacrylonitrile fibers was developed, which has high efficiency of wastewater purification from PP (E = 99.5%). For the developed sorbents, the sorption capacity for the dissolved oil product was calculated, which decreases in the following order: filter based on TEG and PANV (95 g/g) > TEG (86 g/g) > TEG foil (fine-cut) (68 g/g) > TEG foil (coarse-cut) (60 g/g) > granulated TEG (40 g/g).

Keywords: Wastewater; Adsorption of petroleum products; Sorbents; TEG; Perlite

* Corresponding author.