Nowadays, the problem of micropollutants presented in water is raising the substantial concern, worldwide. Mainly due to fact that the pollutants may have adverse impacts on the aquatic ecosystem and human health. Meanwhile, the among and variety of micro-pollutants infiltrating water resources have increased rapidly. The Polish National Fund for Environmental Protection and Water Management reports that in addition to the previously defined micropollutants, aromatic hydrocarbons, pesticides or halogenated compounds, more and more pharmaceuticals, drugs and over-the-counter medical compounds are found in water now. All these pollutants significantly contributes to the deterioration of quality of water. These substances are also identified in drinking water.

The aim of the presented project is to develop sensory materials able to multiple recognition of selected groups of micropollutants in waters. Self-regeneration of the proposed materials will not only allow them to be reused, but above all to determine the concentration of pollutant in the filtered water.

As reported the Polish Supreme Audit Office , as well as the American ProQuest, antibiotics are widely abused in animal husbandry. Sales of veterinary antibiotics in Poland increased by 33% between 2011 and 2018. Such frequent use of antibiotics causes their very easy penetration into surface waters. A similar problem exists with herbicides. Spraying is common practice for many farmers to get the best possible yield. This causes the residues of active substances to be found in soil and agricultural crops. They can cause damage to successive plants and be washed into the groundwater. For this reason, constant and regular monitoring of the concentration of hazardous substances in waters is essential.

One of the problems in removing micropollutants from water is the problem of their identification. Many harmful substances appearing in the waters create the so-called chemical cocktails. The very large variety of these compounds, often similar to each other in terms of molecular weights, makes their separation and identification very difficult, and sometimes even impossible.

In the presented project, attempts will be made to obtain self-regenerating sorption materials and then apply them in the solid phase extraction technique, SPE.

For many years, the most popular method of cleaning sorbents used by scientists is extraction with chemicals, often harmful or toxic. However, on an industrial scale, mainly due to the lack of an effective, safe and economical method of regeneration, sorbents are not reused.

During the project, four types of core-shell grains based on commercially available poly(vinyl chloride) will be obtained. A pH-sensitive or heat-sensitive layer of SMIP with imprints of an aminoglycoside antibiotic - gentamicin or a pesticide - metolachlor will be introduced on their surface. To obtain efficiently working microspheres, the parameters of polymerization and molecular imprinting will be selected. The popular acrylic acid (AA) or N-isopropylacrylamide (NIPAM) will be used as the functional monomer. The greatest emphasis will be placed on obtaining effective materials by aqueous polymerization at ambient temperature. It is the most desirable option from the point of view of the so-called green chemistry.

In the next step, the obtained grains will be placed in the SPE columns. In the process of water filtration, selected micropollutants will form complexes with imprints in the sorbents and thus will be removed from the solution. Then, by filtration of the water with changed pH / temperature, the polymer network will "loosen" and the absorbed compounds will be released. In this way, we will first of all obtain the possibility, in an easy and simple way, to measure the amount of antibiotics / pesticides present in the filtered solution, as well as the regeneration of the sorbent allowing its further use. **As a result, a simple, safe and effective method will be developed for the identification of micropollutants and the regeneration of used sorbents.**