

UCGWATER+: un proyecto europeo para el desarrollo de estrategias de descontaminación de aguas procedentes de la gasificación subterránea del carbón y otras actividades industriales

INCAR-CSIC: Alberto Castro-Muñiz, Silvia Villar-Rodil, Fabián Suárez-García, Juan I. Paredes

IJL-CNRS: Jimena Castro Gutierrez, Antonio Borrero López, Alain Celzard, Vanessa Fierro

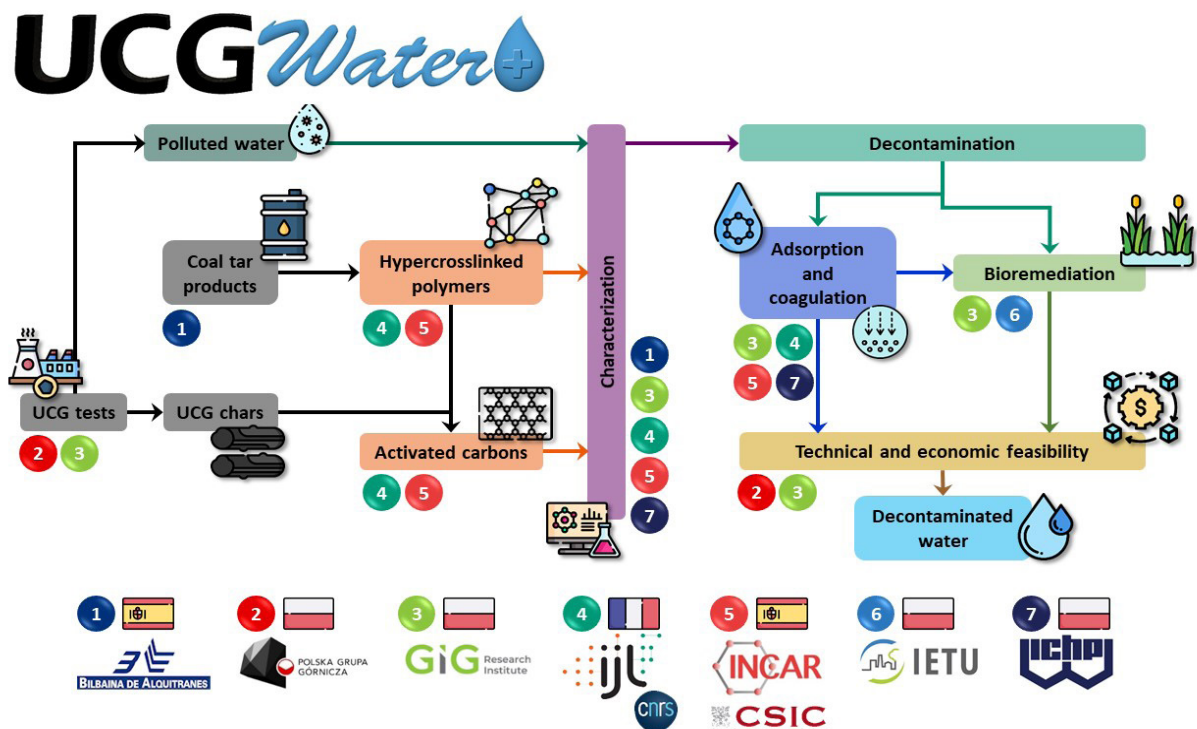
GIG: Aleksandra Strugała-Wilczek, Krzysztof Kapusta, Katarzyna Ponikiewska, Ireneusz Pyka, Lucyna Szoltysek, Krzysztof Stańczyk

ICHPW: Anna Kwiecińska- Mydlak

IETU: Lukasz Jalowiechi, Grażyna Płaza

BASA: Miguel Ángel Díaz, Noelia Muñoz Soler, Enrique Esparza-Alons

PGG: Bożena Prietz, Krzysztof Michalik, Mateusz Marcinkowski, Bartłomiej Bezak



Scheme 1. Flow-chart of the interactions and interdependencies of UCGWATER+ partners and work packages (<https://www.ucgwaterplus.eu/>).

UCGWATER+ “Coal- and bio-based water remediation strategies for underground coal gasification and beyond” is a project funded by the European Union through the “Research Fund for Coal and Steel (RFCS)” funding programme. This project aims at remediating waters polluted with organic and inorganic contaminants as a result of the operation of underground coal gasification (UCG) plants. Three remediation strategies are contemplated: (1) (electro) coagulation, (2) the use of polymer- and carbon-based adsorbents derived from coal by-products and residues, thus contributing to revalorization of the latter as a positive side-effect of the action, and (3) bioremediation based on constructed wetlands. Combinations of these methods are explored for maximum decontamination efficiency, while also analysing their technical and economic feasibility. The utility of the developed materials and decontamination strategies beyond UCG water remediation is addressed as well.

The project has a duration of three years and began on September 1, 2021. The project involves 2 companies and 5 public research centres: Bilbaina de Alquitranes SA (www.bilbaina.com/) (**BASA**, Spain); Polska Grupa Górnicza SA (www.pgg.pl) (**PGG**, Poland); Institut Jean Lamour (www.ijl.univ-lorraine.fr) (**IJL-CNRS**, France); Główny Instytut Górnictwa (www.gig.eu/en) (**GIG**, Poland); Instytut Chemicznej Przerobki Węgla (www.ichpw.pl/en/) (**ICHPW**, Poland); Instytut Ekologii Terenów Przemysłowych (www.ietu.pl) (**IETU**, Poland) and Instituto de Ciencia y Tecnología del Carbono (www.incar.csic.es) (**INCAR-CSIC**, Spain), which acts as project coordinator.

The objectives of the project will be achieved by the completion of a series of tasks which will be completed by the different partners as summarized in Scheme 1. The approach proposed in UCGWATER+ includes the reuse and revalorization of the residues from the UCG plants to obtain materials that will be

used in the decontamination of the polluted water generated during the coal gasification, in a context of the circular economy. Thus, coal samples will be used in a large-scale experimental installation to run UCG tests at different oxidative conditions. The generated post-processing waters will be sampled within the whole course of the gasification experiments and the type and concentration of the produced contaminants will be determined.

A range of coal tar by-products and residues with different composition and properties (naphthalene oil, wash oil, creosote, reject products and phenolic oil), obtained by distillation and subsequent processing of bituminous coal, will be used as precursors in the synthesis of hypercrosslinked polymers (HPCs). These HPCs, as well as chars obtained directly from the UCG test, will then be used as precursors for the preparation of activated carbons.

The decontamination of the polluted water will be approached from the three abovementioned complementary strategies. The technical and economic feasibility of the proposed water remediation methods will be analysed and the extrapolation of these methods to the decontamination of other polluted waters from other industrial processes is expected.

This project is funded by the Research Fund for Coal and Steel (RFCS) of the European Union (EU) under Grant Agreement No. 101033964.