



### *Projet de recherche*

## **BauxFilter - Treatment and hydraulic performances of pilot scale filters filled with modified bauxite residue (MBR) designed to upgrade phosphorus removal in small wastewater treatment plants**

### **Session**

2018

### **Co-leader(s)**

Pierre Hennebert

### **Project type**

Projet OHM

### **OHM(s) involved**

- OHM Bassin Minier de Provence

### **Keywords**

[Bauxite residue; phosphorus treatment; reactive filter; wastewater treatment](#)

Chimie

The addition of filter units containing modified bauxite residue (MBR) may be a viable solution to upgrade phosphorus (P) removal in small wastewater treatment plants, and to valorise a waste from the aluminum industry. Several studies have demonstrated that MBR has a high capacity of P sorption from aqueous solutions. However, there is a lack of data in the literature concerning hydraulic and treatment performances of pilot-scale filters. This project aims at evaluating the hydraulic and treatment performances of pilot-scale MBR-filters designed to retain P from a reconstructed wastewater. The effect of vegetation growth, temperature, and wastewater composition, on hydraulic and treatment performances will be investigated. Also, chemical and mineralogical analyses will be performed to determine the mechanisms of P removal achieved by MBR in the filters. Indeed, knowledge and understanding of P retention mechanisms and hydraulic behavior under pilot-scale is indispensable to improve the design and operation of the filters.

## **Leader**

Cristian Barca

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Cristian Barca (leader of the project), Ass. Pr. (Maître de Conférences) in Chemical Engineering at the Institute of Technology (IUT) of the Aix-Marseille University, laboratory Mécanique, Modélisation et Procédés Propres (M2P2 Aix-Marseille Univ. ECM UMR CNRS 7340), research team Traitement des Eaux et Déchets (TED), since 2015. He received his PhD in Chemical Engineering, speciality Environment, from the Ecole des Mines de Nantes (France), laboratory Génie des Procédés, Environnement et Agroalimentaire (GEPEA UMR CNRS 6144), in Oct. 2012. He is leader of the research topic “Chemical and physical-chemical processes” at M2P2-TED, which is the main topic of this project. He has a proved research experience on the development of innovative filter systems to treat wastewater (e.g. biofilters, reactive filters, constructed wetlands), with a particular emphasis on: (i) treatment of nutrients and emerging pollutants; (ii) valorisation of industrial waste and by-products as filter media; (iii) recovery of energy and valuable resources from wastewater.

## Participants

Pierre

Hennebert

Dr. Science du sol, 1986. Ingénieur Agronome orientation Science du sol, 1980.  
Habilitation à diriger des recherches (Aix-Marseille Université, France), 2016.

### Compétences

- Analyse environnementale normalisée de sol, d'eau, de déchets industriels et des boues, comparaison des méthodes d'essai, validation des méthodes d'essai. Animateur du groupe de travail « lixiviation » du Comité Européen de Normalisation CEN TC 292 « Caractérisation des déchets » puis du CEN TC 444 « Méthodes analytiques pour la caractérisation environnementales des sols, déchets, biodéchets et boues ». Analyse des colloïdes et nanoparticules des déchets ;
- Composition des déchets, émission de polluants dans l'environnement (eau et sol) et atténuation de l'émission, valorisation des déchets en milieu naturel ;
- Méthode d'évaluation de la dangerosité des déchets, et classification des déchets. Expert pour le Ministère de l'Ecologie au Comité Consultatif sur le...