



# Recycling of ultra-high performance fibre-reinforced concrete with a high voltage electric pulse fragmentation process

Kathy Bru, Solène Touzé, Pascal Auger, Daniel B Parvaz

## ► To cite this version:

Kathy Bru, Solène Touzé, Pascal Auger, Daniel B Parvaz. Recycling of ultra-high performance fibre-reinforced concrete with a high voltage electric pulse fragmentation process. IV International Conference Progress of Recycling in the Built Environment, Oct 2018, Lisbonne, Portugal. hal-01836984

**HAL Id: hal-01836984**

**<https://brgm.hal.science/hal-01836984>**

Submitted on 12 Jul 2018

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

## **RECYCLING OF ULTRA-HIGH PERFORMANCE FIBRE-REINFORCED CONCRETE WITH A HIGH VOLTAGE ELECTRIC PULSE FRAGMENTATION PROCESS**

**Kathy Bru (1), Solène Touzé (1), Pascal Auger (2), Daniel B. Parvaz (3)**

(1) BRGM, Water, Environment and Ecotechnologies Division, F-45060 Orléans, France

(2) BRGM, Laboratories Division, F-45060 Orléans, France

(3) SELFRAG AG, Kerzers, Switzerland

### **Abstract**

This study deals with the recycling of a particular Ultra-High Performance Fibre Reinforced Concrete (UHPFRC) called Ductal®. This material, characterized by a high mechanical resistance and a high steel fibre content, represent a challenge for the conventional recycling processes. The high voltage electric pulse fragmentation (EPF) technology was investigated here as a potential breakthrough technology for liberating the steel fibres from the sand/cement paste, with the objective to recycle both fractions into new concrete products. The EPF technology relies on highly energetic electrical pulses to selectively fragment composite materials i.e. to generate cracks along grain boundaries. Tests were performed at lab-scale and showed that the steel fibres are liberated in the 0/2 mm size fraction. The influence of the specific energy on EPF performances was investigated. Good recovery rates of the steel fibres were obtained, confirming the potential of EPF for the recycling of UHPFRC.