

Project proposal template

Graduate School studentships

March 2015

<i>Project title</i>	Development of an innovative solar energy powered electrocoagulation system to remove fluoride from contaminated groundwater		
<i>First Supervisor</i>	Dr	<input type="text" value="Parneet Paul"/>	
<i>Second Supervisor</i>	<input type="text" value="Mr Richard Hill, Whitewater Limited (UK)"/>		
<i>School</i>	<input type="text" value="Civil Engineering and Construction"/>		
<i>Other member of supervisory team (no more than three KU supervisors in total)</i>	<input type="text" value="Mr Steve Kingdon-Saxby, SCL Water Limited (UK)"/>		
<i>Specific requirements beyond 2:1 degree</i>	<input type="text"/>		

Project summary (max 4,000 characters)

High fluoride levels in water are harmful to humans, and are a significant issue in large parts of the world's groundwater. This project looks at a radical re-think and step-change in how we currently treat groundwater contaminated with high fluoride levels in the light of several constraints affecting the current unsustainable, centralised systems of using high chemical dosing as the main treatment options. Consequently it investigates the development of an innovative, decentralised system for low income communities (or for remote rural areas in high income countries) that uses electrocoagulation methods to precipitate out fluoride ions in the groundwater. This proposed electrocoagulation method is a tried-and-tested technology that has been around since the 1960's. However, due to the relatively cheap cost of chemicals like activated alumina and also relatively high costs of using mains electricity to treat large volumes involved in centralised water treatment, electrocoagulation has never been seriously considered to be applied in this context. With the introduction of efficient and inexpensive solar photovoltaic systems, cheap and affordable supplies of electricity have now become a real option for low income communities in tropical, sub-tropical and arid climates that experience high sunshine levels throughout the year. SCL Water Limited (UK) is one of a handful of companies leading the way in this sector by supplying competitively priced solar energy borehole water pumping systems to communities in Europe, Africa and Asia. Whilst selling such systems, it has become aware of the fluoride issue in these same regions, and contacted Kingston University to help address the research needs in this area. Consequently, this proposal looks at developing a solar powered electrocoagulation reactor specifically geared towards fluoride ion removal from groundwater that would be pumped out using the same solar energy source.

