



<b>Position Title</b>	PhD Studentship - Design and Synthesis of Surface Immobilised Additives to Improve Engine Efficiency and Cleanliness
<b>Project Abstract</b>	<p>The occurrence of engine knock has been frequently identified as the major barrier to increasing the efficiency of spark ignition (SI) engines. Engine knock is caused by sequential auto-ignitions within the cylinder which elevate the local pressure amplitude and form pressure waves. The knocking phenomenon is chemical in origin and is the consequence of a radical chain reaction. Depending on the operating condition of the engine, a differing mixture of O atom, H, OH, HO<sub>2</sub> and CH<sub>3</sub> radicals or molecular O<sub>2</sub>, are the dominant radical chain carriers. To prevent knock, the end-gas must be prevented from auto-igniting. Historically, this was achieved using tetraethyllead (TEL). Studies of the mechanism of action of TEL proposed that metallic lead was responsible for the interception of HO<sub>2</sub> radicals <i>i.e.</i> termination of the radical chain and prevention of ignition.</p> <p>This work invents the concept of radical trapping by designing polymeric metallic and non-metallic materials to trap and retain the radical chain carriers of the combustion processes. This would transform the effectiveness of the additive in the application as it would relax the current high potency-low concentration requirement, to a more amenable low-potency-high concentration scenario.</p> <p>Work package 1 will focus on the immobilisation of additives on metallic and/or composite surfaces. Work package 2 will test the efficacy of these substrates using an ignition quality tester (IQT) at TCD.</p>
<b>Experience</b>	The PhD position is funded for 4 years, including a monthly stipend and materials and travel budget. Applicants should hold a minimum of an honours bachelor's degree at 2:1 level or equivalent in a relevant subject such as Physics, Chemistry or Chemical Engineering. Candidates should also have a strong interest in Energy.
<b>Funding</b>	The studentship will cover fees up to €5,500 pa and a stipend of €18,500 pa
<b>Location</b>	Trinity College Dublin
<b>Closing Date</b>	Friday 29 <sup>th</sup> June 2018
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