We have shown that aluminium(salen) complexes make highly active catalysts for cyclic carbonate synthesis from epoxides and CO$_2$ at room temperature and atmospheric pressure. We have developed these catalysts from 1 to 2 to 3 with increasing catalytic activity. However, complex 3 is insoluble, making its mode of action difficult to study. Therefore, we aim to prepare more soluble versions of catalyst 3 by introduction of appropriate substituents onto the aromatic ring of the catalyst. The specific targets will be silylated derivatives 4 as a route to the synthesis of the required aldehydes is available and large solubilising groups (tert-butyl, phenyl, isopropyl etc) can be introduced onto the silicon atoms.

In addition to aluminium, other metal complexes of the silylated ligands will be prepared including chromium(III) and cobalt(III) and their catalytic activity in the formation of both cyclic and polycarbonates from epoxides and CO$_2$ investigated. The complexes will also be investigated as catalysts for the reaction of epoxides with other heterocumulenes such as isocyanates and CS$_2$ leading to wide range of 5-membered heterocycles.

Application closing date: March 2017
Interview date: April 2017
Funding source: student to secure own funding
Eligibility: UK / EU / Overseas

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