

## Young Career Focus: Dr. Kevin Lam (University of Greenwich, UK)

**Background and Purpose.** SYNFORM regularly meets young up-and-coming researchers who are performing exceptionally well in the arena of organic chemistry and related fields of research, in order to introduce them to the readership. This Young Career Focus presents Dr. Kevin Lam (University of Greenwich, UK).

### Biographical Sketch



Dr. K. Lam

In 2010, **Kevin Lam** received his PhD in Medicinal and Synthetic Organic Chemistry from the Catholic University of Louvain in Belgium, under the supervision of Professor István Markó. His doctoral work explored the use of electrochemistry and photochemistry as green alternatives to activate organic molecules. This work resulted in the development of a new radical-based deoxygenation reaction (the Markó–Lam reaction).

After his PhD, he moved to the University of Vermont (UVM, USA). His research focused on applying analytical/physical electrochemistry alongside spectroscopy to study the complex redox behaviour of organometallic compounds.

This work bolstered the use of weakly coordinating electrolytes/solvents as an electrochemical medium to allow for the generation and characterisation of highly reactive and unstable  $17e^-$  organometallic radical cations. Additional work at UVM led to the pioneering of a new method to modify electrode surfaces through an ethynyl linkage. The covalent attachment of molecules to an electrode surface is fundamental to the field of molecular electronics and numerous materials applications.

In 2013, he accepted a position of Assistant Professor at Nazarbayev University in Astana (Kazakhstan). During his time there, Kevin developed a new research program in the field of Molecular Electrochemistry. His work led to the development of new organometallic anticancer compounds as well as to the discovery of novel, efficient and green electrocatalysts for  $CO_2$  recycling.

In 2017, Kevin accepted an Associate Professor position in Medicinal Chemistry at the University of Greenwich (UK) where he continues his interdisciplinary research.

### INTERVIEW

**SYNFORM** *What is the focus of your current research activity?*

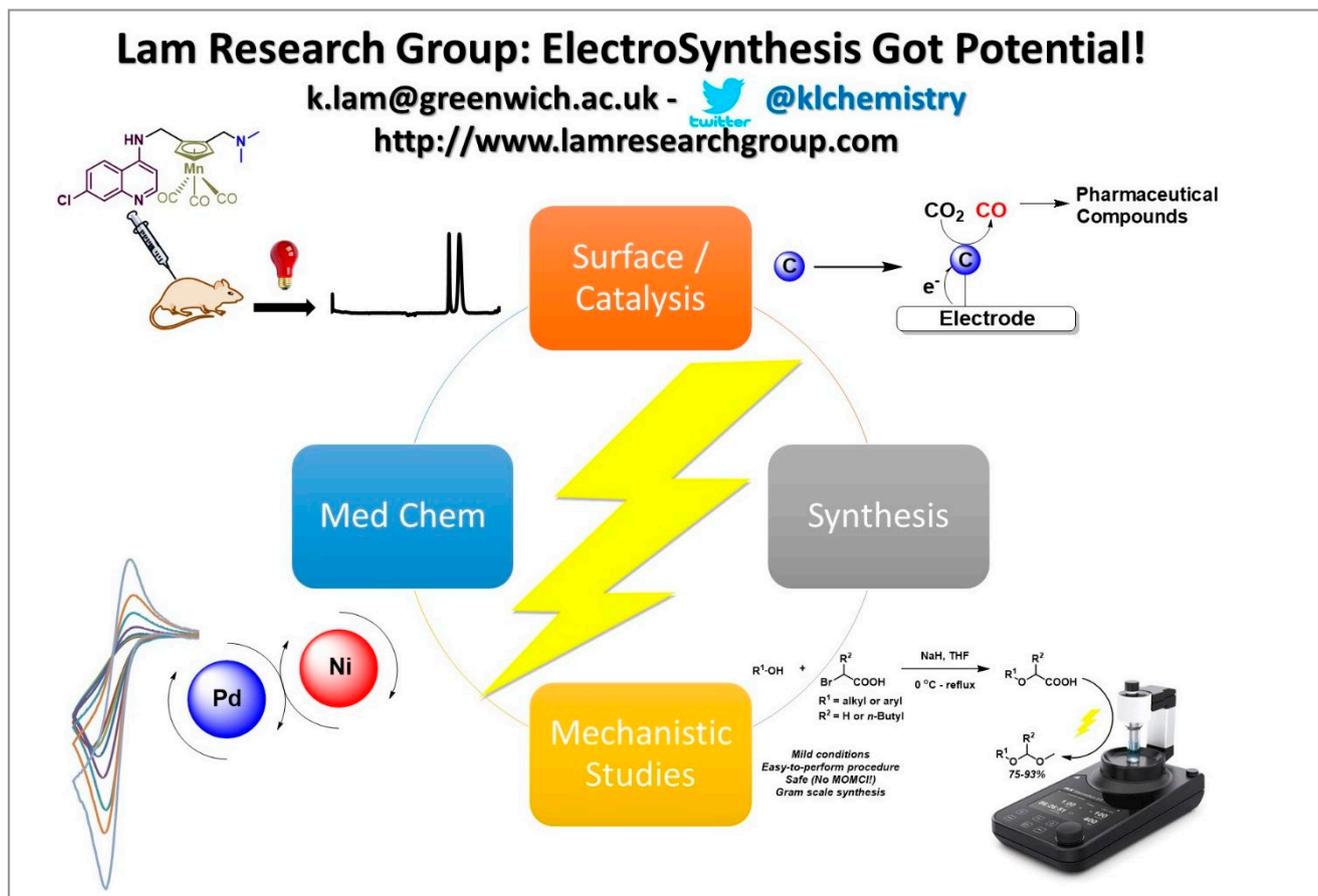
**Dr. K. Lam** Our current research is centred around the study of electron transfers across the fields. We are a curiosity-driven research group and as a consequence, we perform research in fields that might seem to be completely unrelated at first sight (Scheme 1). For instance, we have been using electrochemistry in materials chemistry for surface modification, in organometallic chemistry for the elucidation of complex redox mechanisms, in organic synthesis for the preparation of highly reactive intermediates and more recently even in medicinal chemistry!

**SYNFORM** *When did you get interested in synthesis?*

**Dr. K. Lam** I developed an interest in organic chemistry during my first year at the Université Catholique de Louvain in Belgium where we were taught synthesis by my friend and mentor, Prof. István Markó who has passed away recently. He was a fantastic lecturer who taught us organic chemistry the ‘old way’ using a blackboard and chalk without ever relying on any notes! This is when I became fascinated with organic synthesis that is both a science and an art!

**SYNFORM** *What do you think about the modern role and prospects of organic synthesis?*

**Dr. K. Lam** Organic synthesis is everywhere, it might not always be visible, but it is literally taking part, in the background sometimes, in projects across the fields from biochemistry where one has to prepare specific peptides to materials chemistry where researchers need to synthesise new molecules to tune the physical properties of their new materials. Organic synthesis has definitely a bright future!



**Scheme 1** The Lam research group's areas of interest

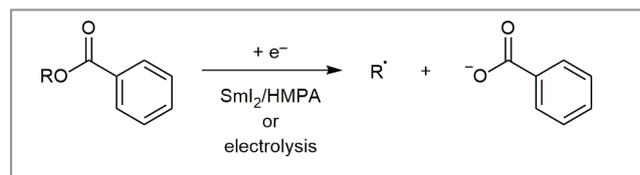
**SYNFORM** Could you tell us more about your group's areas of research and your aims?

**Dr. K. Lam** As mentioned earlier, we have a broad area of research with a special focus on organic and organometallic electrocatalysis. Readers might be surprised to learn that this is an extremely old discipline. Indeed, the first organic electrocatalysis was conducted by Faraday himself! We are using electrochemistry not only as a way to generate highly reactive organic intermediates (carbanion, carbocations, radicals, carbenes, etc.) but also as a unique approach to study electron transfers in organic molecules and to shed light on reaction mechanisms.

Our main goal is to demonstrate the use of electrochemistry in organic chemistry by making synthetic chemists' lives easier and showing them how toxic and expensive reagents could be replaced by the cheapest and the greenest source of electrons available to date: electricity itself!

**SYNFORM** What is your most important scientific achievement to date and why?

**Dr. K. Lam** My major achievement is probably the fact that people named, much to my surprise, a reaction after István and me! The 'Markó-Lam deoxygenation' (Scheme 2) and at the same time, this is a great tribute to the fantastic chemist that István was.



**Scheme 2** The Markó-Lam deoxygenation

*Markó-Lam*