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The growth and synthesis of platinum nanoparticles via templated organic assemblies

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The impact of nanotechnolgy is evident as nanoscience is expanding in all areas of science and technology. The study of nanomaterials has then sparked a wide range of interest, especially for metallic nanoparticles (NPs), where their unique electronic and optical properties can be tailored for specific applications. The growth and synthesis of metallic NPs is the key to tailoring, where conditions can be adjusted to manipulate the desired particle shape and sizes. In this research as an example, we report a cost effective yet simple electrochemical set up to synthesize platinum (Pt) NPs via a templated organic assembled known as self-assembled monolayer (SAM). This research aims to explore the progressive/instanteous NP nucleation mechanism and examine the outcome of nucleation based on SAM terminations alkane, carboxylic and alcohol. Chronoamperometry was applied for 120 s and the morphology of the synthesized particles was compared. Preliminary result suggests that the polarity/chain length of a SAM template affects both the particle size and morphology. Scanning electron microscopy imaging and ImageJ software analysis were used to provide an insight of the NP distribution and size. By using SAM as a cost-effective templating technique, it is possible to extend this platform to deposit high quality NPs for metallic metals.

Biography

Danny Hsu Ko is currently a PhD candidate in Chemical and Material Engineering, University of Auckland under the supervision of associate professor Ashton Partridge. He is now working on microfluidics, as a platform for biochemical sensing applications. His fields of interest are in nanotechnology, electrochemistry and microelectronics.

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