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# Galvanic replacement of colloidal monolayer crystal on a QCM device for selective detection of mercury vapor

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## Abstract

Bimetallic nanostructures formed through galvanic replacement (GR) reaction have extraordinary activity in various applications such as catalysis, optics, electronics and bio/chemical sensing, just to name a few. However, the homogenous decoration of metal nanoparticles on less noble metal thin-film substrates to produce long range ordered surfaces for sensing applications using this simple, one step reaction has proved to be a challenge. Here, we demonstrate the formation of polystyrene-based (PS-based) monodispersed nanosphere monolayer (PS-MNM), homogeneously decorated with bi-metallic Pd-Au nanostructures through GR reaction. Furthermore, the size of the Au nanoparticles decorated on the Pd-MNM colloids was controlled for gas sensing applications during GR reaction. Upon transferring the developed materials onto a sensor transducer, namely the quartz crystal

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