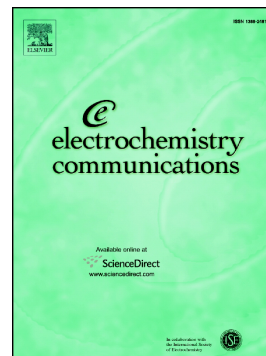


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**Chemical reactivity of Ga-based liquid metals with redox active species and its influence
on electrochemical processes**

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Abstract

Room temperature liquid metals based on gallium demonstrate interesting physical and chemical properties when placed in electrochemical environments. In this work we explore the applicability of hanging liquid metal droplets as electrode materials for simple surface insensitive and surface sensitive electron transfer reactions, namely the electrochemical reduction of $[\text{Ru}(\text{NH}_3)_6]^{3+}$ and $[\text{Fe}(\text{CN})_6]^{3-}$ ions in solution. Significantly we found that for both redox species the electron transfer process was impeded at galinstan (68.5% Ga, 22.5 % In and 10% Sn). This is related to the chemical reactivity of the Ga component which is oxidized when exposed to aqueous solutions of $[\text{Ru}(\text{NH}_3)_6]^{3+}$ and $[\text{Fe}(\text{CN})_6]^{3-}$ to generate the reduced form of the redox mediator. For the former this results in the production of Ru-red and Ru-brown

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