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Surface nanodroplets for highly efficient liquid-liquid microextraction MIAOSI LI, ZIYANG LU, HAITAO YU, XUEHUA ZHANG, Royal Melbourne Institute of Technology — Nanoscale droplets on a substrate are an essential element for a wide range of applications, such as laboratory-on-chip devices, simple and highly efficient miniaturized reactors for concentrating products, high-throughput single-bacteria or single-biomolecular analysis, encapsulation, and high-resolution imaging techniques. The solvent exchange process is a simple bottom-up approach for producing droplets at solid–liquid interfaces that are only several tens to hundreds of nanometers in height, or a few femtoliters in volume Oil nanodroplets can be produced on a substrate by solvent exchange in which a good solvent of oil is displaced by a poor solvent. Our previous work has significantly advanced understanding of the principle of solvent exchange, and the droplet size can be well-controlled by several parameters, including flow rates, flow geometry, gravitational effect and composition of solutions. In this work, we studied the microextraction effect of surface nanodroplets. Oil nanodroplets have been demonstrated to provide highly-efficient liquid-liquid microextraction of hydrophobic solute in a highly diluted solution. This effect proved the feasibility of nanodroplets as a platform for preconcentrating compounds for in situ highly sensitive microanalysis without further separation. Also the long lifetime and temporal stability of surface nanodroplets allow for some long-term extraction process and extraction without addition of stabilisers.

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