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**Explosive Microsphere Particle Standards for Trace Explosive Detection Instruments** MATTHEW STAYMATES, ROBERT FLETCHER, GREG GILLEN, National Institute of Standards and Technology — Increases in Homeland Security measures have led to a substantial deployment of trace explosive detection systems within the United States and US embassies around the world. One such system is a walk-through portal which aerodynamically screens people for trace explosive particles. Another system is a benchtop instrument that can detect explosives from swipes used to collect explosive particles from surfaces of luggage and clothing. The National Institute of Standards and Technology is involved in a chemical metrology program to support the operational deployment and effective utilization of trace explosive and narcotic detection devices and is working to develop a measurement infrastructure to optimize, calibrate and standardize these instruments. Well characterized test materials are essential for validating the performance of these systems. Particle size, chemical composition, and detector response are particularly important. Here, we describe one method for producing monodisperse polymer microspheres encapsulating trace explosives, simulants, and narcotics using a sonicated co-flow Berkland nozzle. The nozzle creates uniform droplets that undergo an oil/water emulsion process and cure to form hardened microspheres containing the desired analyte. Issues such as particle size, particle uniformity and levels of analyte composition will be discussed.

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