



## OSAC Research Needs Assessment Form

**Title of research need:**

**Keywords:**

**Submitting subcommittee(s):**  **Date Approved:**

*(If SAC review identifies additional subcommittees, add them to the box above.)*

### Background information:

#### 1. Description of research need:

Laboratories using SEM/EDS for characterization of GSR lack access to standardized QA/QC samples that can gauge instrument performance and comparability across laboratories. The community needs access to fully characterized reference stubs that have a known number of particles, a known number of characterized GSR (or GSR simulant) particulates of known particulate sizes. The stubs would be used as proficiency tests as well as instrument controls that will allow labs to determine if their procedures are performing adequately and comparably. However, this research is foundational for development of future validation and error rate studies.

## 2. Key bibliographic references relating to this research need:

- [1] A. Zschunke. The Role of Reference Materials in Analytical Chemistry. *Accreditation and Quality Assurance*. **2003**, *8*, 247.
- [2] L. Niewoehner, H. W. Wenz, J. Andrasko, R. Beijer and L. Gunaratnam. Enfsi Proficiency Test Program on Identification of GSR by SEM/EDX. *J. Forensic Sci.* **2003**, *48*, 786.
- [3] J. M. Amigo, G. Arana, N. Etxebarria and L. A. Fernandez. Emerging Needs for Sustained Production of Laboratory Reference Materials. *Trac-Trends Anal. Chem.* **2004**, *23*, 80.
- [4] H. Emons, T. P. J. Linsinger and B. M. Gawlik. Reference Materials: Terminology and Use. Can't One See the Forest for the Trees? *Trac-Trends Anal. Chem.* **2004**, *23*, 442.
- [5] M. Lauwaars and E. Anklam. Method Validation and Reference Materials. *Accreditation and Quality Assurance*. **2004**, *9*, 253.
- [6] A. M. H. van der Veen. Trends in the Certification of Reference Materials. *Accreditation and Quality Assurance*. **2004**, *9*, 232.
- [7] U. Admon, D. Donohue, H. Aigner, G. Tamborini, O. Bildstein and M. Betti. Multiple-Instrument Analyses of Single Micron-Size Particles. *Microsc. Microanal.* **2005**, *11*, 354.
- [8] L. Niewoehner, J. Andrasko, J. Biegstraaten, L. Gunaratnam, S. Steffen and S. Uhlig. Maintenance of the ENFSI Proficiency Test Program on Identification of GSR by SEM/EDX (GSR2003). *J. Forensic Sci.* **2005**, *50*, 877.
- [9] W. A. MacCrehan and M. Bedner. Development of a Smokeless Powder Reference Material for Propellant and Explosives Analysis. *For. Sci Int.* **2006**, *163*, 119.
- [10] T. Venelinov and A. Sahuquillo. Optimizing the Uses and the Costs of Reference Materials in Analytical Laboratories. *Trac-Trends Anal. Chem.* **2006**, *25*, 528.
- [11] L. Niewoehner, J. Andrasko, J. Biegstraaten, L. Gunaratnam, S. Steffen, S. Uhlig and S. Antoni. GSR2005 - Continuity of the ENFSI Proficiency Test on Identification of GSR by SEM/EDX. *J. Forensic Sci.* **2008**, *53*, 162.
- [12] M. C. Kline, D. L. Duewer, J. C. Travis, M. V. Smith, J. W. Redman, P. M. Vallone, A. E. Decker and J. M. Butler. Production and Certification of NIST Standard Reference Material 2372 Human DNA Quantitation Standard. *Anal. Bioanal. Chem.* **2009**, *394*, 1183.
- [13] G. Zappa, P. Carconi, R. Gatti, A. D'Alessio, R. Di Bonito, L. Mosiello and C. Zoani. Feasibility Study for the Development of a Toner-Reference Material. *Measurement*. **2009**, *42*, 1491.
- [14] T. P. J. Linsinger, G. Roebben, C. Solans and R. Ramsch. Reference Materials for Measuring the Size of Nanoparticles. *Trac-Trends Anal. Chem.* **2011**, *30*, 18.
- [15] R. Zeleny and H. Schimmel. Influence of the Approach to Calibration on the Accuracy and the Traceability of Certified Values in Certified Reference Materials. *Trac-Trends Anal. Chem.* **2012**, *33*, 107.
- [16] J. E. T. Andersen. On the Development of Quality Assurance. *Trac-Trends Anal. Chem.* **2014**, *60*, 16.
- [17] N. G. R. Hearn, D. N. Lafleche and M. L. Sandercock. Preparation of a Ytterbium-Tagged Gunshot Residue Standard for Quality Control in the Forensic Analysis of GSR. *J. Forensic Sci.* **2015**, *60*, 737.

### 3a. In what ways would the research results improve current laboratory capabilities?

Reference stubs made specifically for GSR analysis are vital for establishing baseline method capabilities, figures of merit, and for QA/QC. There currently are no two-component reference stubs representing Sinoxid® type ammunition and no reference stubs representing various types of “non-toxic”, “lead-free” ammunition available.

3b. In what ways would the research results improve understanding of the scientific basis for the subcommittee(s)?

The availability of these reference stubs would help gauge method performance and capabilities across laboratories.

3c. In what ways would the research results improve services to the criminal justice system?

By helping to ensure that methods and instruments are working properly and as per performance specifications found in standardized methods.

4. Status assessment (I, II, III, or IV):

I

	Major gap in current knowledge	Minor gap in current knowledge
No or limited current research is being conducted	<b>I</b>	<b>III</b>
Existing current research is being conducted	<b>II</b>	<b>IV</b>

*This research need has been identified by one or more subcommittees of OSAC and is being provided as an informational resource to the community.*

Subcommittee

Approval date: 11/21/16

*(Approval is by majority vote of subcommittee. Once approved, forward to SAC.)*

SAC

1. Does the SAC agree with the research need? Yes No

2. Does the SAC agree with the status assessment? Yes No

*If no, what is the status assessment of the SAC:*

Approval date: 11/28/16

*(Approval is by majority vote of SAC. Once approved, forward to NIST for posting.)*