National Institute of Standards & Technology

Certificate of Analysis

Standard Reference Material® 351

Sodium Carbonate

(Acidimetric Standard)

This Standard Reference Material (SRM) is certified as a chemical of known assay and is intended for use as a primary acidimetric standard. The SRM consists of highly purified sodium carbonate in a 50 g unit.

Certified Value and Uncertainty: The certified value provided below is based on the results of coulometric assays of dried material (see "Drying Instructions"). The expanded uncertainty was calculated according to the CIPM approach [I] and represents the 95 % level of confidence.

Sodium Carbonate Assay, Mass Fraction 99.9796 ± 0.0090 %

Coulometric Assay: This material was assayed by automated coulometric back-titration [2], to a strong acid endpoint, of weighed, dried, sodium carbonate samples after addition of excess coulometrically standardized hydrochloric acid and elimination of the product carbon dioxide. The certified mass fraction represents the result of eight titrations of samples from four randomly selected bottles from the entire lot of SRM 351.

Expiration of Certification: The certification of this specific SRM lot is valid until **01 July 2008**, within the measurement uncertainties specified, provided the SRM is stored in accordance with instructions given in this certificate. Periodic reanalysis of representative samples from this SRM lot will be performed, and if significant changes are observed, the purchaser will be notified by NIST. Registration (see attached sheet) will facilitate notification.

Source of Material: The sodium carbonate used for this SRM was obtained from a commercial company. The material was examined for compliance with the specification for reagent grade sodium carbonate as specified by the American Chemical Society [3]. The material was found to meet or exceed these specifications in all respects.

Coordination of the technical activities leading to the certification of this SRM were performed by J.R. Moody of the NIST Analytical Chemistry Division.

Coulometric analyses were performed by K.W. Pratt of the NIST Analytical Chemistry Division.

Consultation regarding the statistical analysis was provided by K.R. Eberhardt of the NIST Statistical Engineering Division.

The support aspects involved in the issuance of this SRM were coordinated through the NIST Measurement Services Division.

Stephen A. Wise, Chief
Analytical Chemistry Division

Gaithersburg, MD 20899
Certificate Issue Date: 26 April 2006
See Certificate Revision History on Last Page

Robert L. Watters, Jr., Chief
Measurement Services Division

NOTICE AND WARNINGS TO USERS

This SRM is certified for acidimetric assay **ONLY**. For pH standardizations near pH 10 use SRM 191c.

Storage: This SRM should be stored in its original bottle at room temperature. It must be tightly re-capped after use and protected from moisture, light, and acid fumes.

Drying Instructions: SRM 351 sodium carbonate samples must be dried at 275 °C - 280 °C for 4 h in order to yield the certified assay.

Homogeneity: Tests indicate that this SRM is homogeneous within the uncertainty limits for sample sizes greater than 200 mg, provided the SRM is dried in accordance with the drying instructions given in this certificate. Samples less than 200 mg are not recommended.

REFERENCES

[1] ISO; *Guide to the Expression of Uncertainty in Measurement*; ISBN 92−67−10188−9, lst ed.; International Organization for Standardization: Geneva, Switzerland (1993); see also Taylor, B.N.; Kuyatt, C.E.; *Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results*; NIST Technical Note 1297, U.S. Government Printing Office: Washington, DC (1994); available at http://physics.nist.gov/Pubs/.

[2] Pratt, K.W.; *Automated, High Precision Coulometric Acidimetry. Part II. Strong and Weak Acids and Bases*; Anal. Chem. Acta, Vol. 289, p. 135 (1994).

[3] *Reagent Chemicals*, 8th Ed., American Chemical Society, Washington, DC (1993).

Certificate Revision History: 26 April 2006 (Update of expiration date and editorial changes); 25 September 1996 (Original certificate date).

Users of this SRM should ensure that the certificate in their possession is current. This can be accomplished by contacting the SRM Program at: telephone (301) 975-6776; fax (301) 926-4751; *email srminfo@nist.gov; or via the Internet at http://www.nist.gov/srm.*