

National Bureau of Standards

Certificate of Analysis

Standard Reference Material 470

Mineral Glasses for Microanalysis

These glasses have been fabricated for use in microanalysis techniques such as electron probe microanalysis (EPMA) and secondary ion mass spectrometry (SIMS). The glasses are homogeneous and are especially useful as standards for the analysis of minerals, glasses, and ceramics.

Composition in Weight Percent

Constituent	SiO ₂	FeO	MgO	CaO	Al ₂ O ₃
-------------	------------------	-----	-----	-----	--------------------------------

Glass K-411

Certified Value	54.30 ± 0.20 ^a	14.42 ± 0.20	14.67 ± 0.20	15.47 ± 0.20	
Wet Chemistry					
LAB A ^b	54.24(0.02)	14.49(0.18)	14.64(0.08)	15.53(0.18)	
LAB B	54.36	14.34	14.69	15.41	
EPMA					
LAB C ^c	54.89(0.96)	14.48(0.27)	15.12(0.20)	15.49(0.15)	

Glass K-412

Certified Value	45.35 ± 0.20	9.96 ± 0.20	19.33 ± 0.20	15.25 ± 0.20	9.27 ± 0.20
Wet Chemistry					
LAB A ^b	45.38(0.04)	10.10(0.20)	19.33(0.02)	15.29(0.10)	9.26(0.12)
LAB B	45.32	9.82	19.32	15.21	9.28
EPMA					
LAB C ^c	45.41(0.77)	9.94(0.18)	19.66(0.25)	15.44(0.15)	9.34(0.29)

^aThe uncertainty of ± 0.20 wt.% assigned to the certified values is the 2-sigma value. This error is a pooled value for all oxides estimated from the ranges between the two laboratories using wet chemical techniques.

^bThe average and (range) of two analyses.

^cThe average and (range) of three analyses.

The technical measurements were performed by C. E. Fiori and R. B. Marinenko under the direction of K.F.J. Heinrich.

The support aspects involved in the certification and issuance of this Standard Reference Material were coordinated through the Office of Standard Reference Materials by R. Keith Kirby.

These glasses were prepared in the Ceramics, Glass, and Solid State Science Division of the National Bureau of Standards' Center for Materials Science by D. H. Blackburn and D. A. Kauffman.

The two glasses were tested for microhomogeneity by both random sampling and periodic integrator traces. This work was done at NBS by R. B. Marinenko. No evidence of inhomogeneity was observed in these glasses. An NBS 260 Series Special Publication is being prepared which will describe these microhomogeneity studies and the statistical evaluations.

The wet chemical analyses were performed at the Smithsonian Institution, Washington, D.C. by G. Jarosewich and J. Norberg, and at Pennsylvania State University, University Park, PA, by N. H. Suhr and J. C. Devine.

EPMA was performed at NBS by C. Fiori using different standards where possible. For matrix corrections, the NBS correction procedure, COR (Henoc. J., Henrich, K. F. J., and Myklebust, R. L., National Bureau of Standards Technical Note 769, 1973) was used. While the EPMA results are in good agreement with the wet chemical analyses, they were not included in the determination of the certified values.

A trace of Al_2O_3 (<0.1%) was spectrographically detected in K-411 and a small amount of MnO (approximately 0.1%) was observed in both glasses by atomic absorption.