

## **The ternary system $K_2O-CaO-SiO_2$ and its significance for the characterization of residual materials**

V. Kahlenberg and E. Arroyabe

University of Innsbruck, Institute of Mineralogy & Petrography, Innsbruck, Austria (volker.kahlenberg@uibk.ac.at)

The last ten years have seen a constantly growing interest of public authorities, industry and research institutions in sustainable waste management and recycling. This can be directly attributed to the fact that these issues are of vital importance for conserving natural resources, reducing the emission of greenhouse gases and protecting natural ecosystems as well as public health. One of the central aspects towards a more 'ecologically' oriented waste technology is the reuse of residual materials.

Since potassium calcium silicates have been encountered in several chemically and mineralogically oriented studies on materials such as ashes from biomass combustion, fertilizers produced from the residues of oil-shale industry or from steelmaking slags, respectively, it is not surprising that the system  $K_2O-CaO-SiO_2$  has been in the focus of research activities. So far, the interpretation of the results concerning the existence, formation and assemblage of certain phases relied exclusively on the only available phase equilibrium study of the corresponding ternary system that was published 80 years ago by Morey et al. [1].

In the course of a reconnaissance study we could show that suspicion has to be attached to the number and the composition of the postulated potassium calcium silicate phases as well as to their reported melting points and melting behaviour. The system  $K_2O-CaO-SiO_2$  is another example of a comparatively simple system where there are still many open problems to be solved. A more complete and comprehensive reinvestigation would be highly desirable.

[1] G.W. Morey, F.C. Kracek, N.L. Bowen, *J. Soc. Glass Technol.* **1930**, 14, 149.