Errata and Comments

Minor element chemistry of hemo-ilmenite and magnetite in cumulate rocks from the Sokndal Region, South Rogaland, Norway, by Peter Robinson, Peter T. Panish, and Suzanne A. McEnroe (vol. 86, p. 1469–1476, 2001).

The convenience of plotting analyses of both rhombohedral and cubic oxide analyses on the same diagram, as explained in this paper, can come at the risk of falling into a graphical/numerical trap. Hindsight shows that we have done this in handling analyses with variable Mg contents in Figures 2, 3, and 4.

One way to make a simultaneous image of the two series is to superimpose graphically the two composition planes illustrated in Figure 2A. This was done in Figures 3 and 4 (with exaggeration of the Mg component) so that we see a triangle (note "Limit of Rhombohedral Oxides") superimposed on a rectangle. However, the correct plotting parameter for the Mg component in such a triangle should be $Mg/(R^{2+} + [R^{3+}/2])$, which is equivalent to Mg per 2-cation formula unit. What we actually used was Mg/R^{2+}, which can only give the correct position on the triangle for ilmenites with no hematite component.

Converting the plotting parameter Mg/R^{2+} into geometry is like projecting rhombohedral oxide analyses from the triangular plane onto a square plane like the cubic oxide plane, with lines of projection passing through the correct ratio of Mg/R^{2+} on the Mg-R^{2+} axis in Figure 2A. Geometrically this has the peculiar effect of opening up the triangle into a square with pure Fe_2O_3 all along one edge. On such a square the vertical scale is correctly $2Ti/(2Ti + R^{3+})$ and the horizontal scale is Mg/R^{2+} as we used, with the proviso that as analyses approach the Fe_2O_3 edge, the ratio Mg/R^{2+} becomes subject to progressively more error and is indeterminate at pure Fe_2O_3. Fortunately this mode of portrayal has an advantage we did not quite foresee. It demonstrates true fractionation of Mg and Fe^{2+} between ilmenite and the ilmenite-poor solid solution in hematite, where Mg is favored in the ilmenite. This feature is quite unrelated to the "Limit of Rhombohedral Oxides" that we indicated on Figures 3 and 4, which actually belongs to a projection with a different plotting parameter. There appear to be no similar problems with Mg in the cubic oxide plane, nor problems with V, Cr, and Al ratios as explained in Figures 2B, C, D, or as used in Figures 5–9.

In summary, then, one has the options of (1) showing Mg ratios using Mg/R^{2+} and a "pseudo-square" as we actually did with our plots in Figures 3 and 4, or of (2) using a superimposed triangle, as we suggested graphically, but this will require a revised plotting parameter $Mg/(R^{2+} + [R^{3+}/2])$, which shows lower ratios for those points with substantial hematite substitution. The lower ratios are plotted along lines of constant ilmenite content and ratio $2Ti/(2Ti + R^{3+})$.

There is a second puzzling matter involving the compositions of ilmenites in the magnetite-rich cumulates illustrated in Figure 4d, and discussed in the bottom of paragraph 1, page 1472. There is a notable decline in Ti ratio of ilmenite with increasing Mg ratio. During analysis of the problem discussed above, we began to suspect this could be an artifact of analytical variation reflected in variable calculated hematite content. If calculated hematite were low, giving a higher Ti ratio, there is also more calculated Fe^{2+} which in turn should lower Mg/R^{2+}. If calculated hematite were high, giving a lower Ti ratio, there is also less calculated Fe^{2+} which in turn should increase Mg/R^{2+}. Careful study of wt% TiO_2 and MgO in the analyses, as well as Ti and Mg per formula unit, shows a strong inverse correlation between these oxides and ions, suggesting the plotted variation in Figure 4d is real and not an artifact of analytical variation or formula calculation.

The editorial office apologizes for mistakenly using analyzes for analyses. Please note that this error is especially prominent in the captions for Figures 3, 5, 7, and 9, and this information may help clarify the meaning there. The correction has been made in the Internet version.