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HIGH-TEMPERATURE STABILITY OF LAURITE AND Ru–Os–Ir ALLOY AND THEIR ROLE IN PGE FRACTIONATION IN MAFIC MAGMAS: ERRATUM

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As a result of an error in the JANAF tables in the free energy of formation (G_f) of the gas species S_2O, H_2S_2 and HS (V. Kress, pers. commun., 2001), calculated values of oxygen and sulfur fugacities, $f(O_2)$ and $f(S_2)$, respectively, presented in Table 1 of Brenan & Andrews (2001; hereafter BA) are incorrect. A revised version of the program COHSmix was kindly supplied by Victor Kress, and new values of $f(O_2)$ and $f(S_2)$ have been calculated, and provided in Table 1 of this erratum (note also that there was a misprint in the rates of gas flow for experiment Ru7, and the correct values are provided). Inasmuch as the error is related to the calculation of the proportions of S-bearing gas species, we have checked the accuracy of calculated $f(S_2)$ using the pyrrhotite sulfur barometer of Toulmin & Barton (1964) at 900°C and log $f(S_2)$ of –1, –2 and –3 . On the basis of this assessment, the revised values of $f(S_2)$ quoted in Table 1 are considered to be accurate to within 0.2 log units. The calculated $f(O_2)$ was previously checked using the stability of solid oxide buffers (nickel – nickel oxide, iron – wüstite), and in this recent evaluation, we have also employed the NiO–Pd redox sensor (Pownceby & O'Neill 1994). This latter technique provided the most precise estimate of $f(O_2)$, and reproduced the COHSmix calculation to within 0.1 log units.

As shown in Table 1, most values of $f(O_2)$ are unchanged relative to those we originally published, whereas the new values of $f(S_2)$ are shifted by as much as 0.7 log units. Although the implications of our results remain essentially unchanged, some specific interpretations of the data need to be modified in light of this correction. First, the maximum thermal stability of laurite estimated from experiments containing either Ru (1275 ± 25°C), or Ru plus other PGE (1265 ± 15°C), now applies to log $f(S_2)$ values of –1.5 and –1, respectively. Second, the intrinsic effect of temperature on coexisting laurite–alloy compositions (Fig. 8 of BA) cannot be defined by our results, as runs at 1250°C are at higher $f(S_2)$ than those at 1200°C. Judging from Figure 1 of BA, the effect of increased T is expected to be offset by higher $f(S_2)$, which probably accounts for the similarity in laurite–alloy pairs for those experiments. Lastly, experiments used to define the effect of $f(S_2)$ on the composition of coexisting laurite–alloy pairs (Fig. 9 of BA) differ only slightly in $f(S_2)$, again probably accounting for the relatively small shift in the composition of laurite–alloy pairs. We are currently performing a series of experiments to document these effects in more detail.

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TABLE 1 (revised). SUMMARY OF EXPERIMENTS CONDITIONS AND RUN-PRODUCT PHASES

Expt.[1]	Duration hours	Temp. °C	$\log f(O_2)$	corr. $\log f(O_2)$	$\log f(S_2)$	corr. $\log f(S_2)$	Gas-flow rates cm^3/min $CO–SO_2–CO_2$	Alloy[2]	Laurite
Sulfide-liquid-undersaturated experiments									
Ru1	12	1300	–9.0	–9.0	–2.1	–1.7	27–4.5–42	x	
Ru4	65	1203	–9.1	–9.2	–2.0	–1.3	8–6–13.5		x
Ru5	16	1250	–9.0	–9.1	–2.0	–1.5	2.6–1–5		x (dc)[3]
Ru8	23	1238	–9.0	–9.1	–2.0	–1.4	7.4–3.7–13.6		x (dc)
Ru10	168	1200	–9.1	–9.3	–2.0	–1.3	8–6–13.4		x (dc)
Sulfide-liquid-saturated experiments									
Ru7	19	1248	–10.0	–10.1	–2.7	–2.5	51–1.3–66		x
RuA	68	1200	–9.1	–9.3	–2.0	–1.3	8–6–13.5		x
fRu1	45	1200	–9.1	–9.3	–2.0	–1.3	8–6–13.5	x	x
fRu2	120.5	1200	–9.1	–9.3	–2.0	–1.3	8–6–13.5	x	x
fRu3	72	1250	–8.1	–8.5	–1.9	–1.0	3.6–5–0	x	x
fRu4a	73	1300	–9.0	–8.9	–1.2	–0.9	10.2–4.5–0	x	
fRu4b	73	1300	–9.0	–8.9	–1.2	–0.9	10.2–4.5–0	assumed[4]	
fRu5rev. (fRu4b)[5]	70	1250	–9.4	–9.3	–1.3	–0.9	10.2–5–0	x	x
fRu5	70	1250	–9.4	–9.3	–1.3	–0.9	10.2–5–0	x	x
fRu7a	79	1200	–9.9	–9.8	–1.2	–0.8	10.2–5–0	x	x
fRu7b	79	1200	–9.9	–9.8	–1.2	–0.8	10.2–5–0	assumed	assumed
fRu8rev (Ru7b)	78	1280	–9.2	–9.0	–1.2	–0.9	10.2–4.8–0	x	
fRu9	74	1200	–9.1	–9.3	–2.0	–1.3	8–6–13.5	x	x
fRu11	114	1250	–8.1	–8.5	–1.9	–1.0	3.6–5–0	x	x
fRu15	114	1200	–9.1	–9.3	–2.0	–1.3	8–6–13.5	x	x
fRu16	114	1200	–9.1	–9.3	–2.0	–1.3	8–6–13.5	x	x

Notes: 1) Experiments with "f" prefix were doped with Ru–Ir–Os–Pt–Pd mixture; all others contained Ru as sole PGE additive. 2) Denotes phase(s) present. 3) Laurite in state of partial decomposition, although interpreted to be stable during the experiment (see text). 4) Phases were assumed to be present based on result from duplicate experiment. 5) Experiments fRu4b and fRu7b were rerun as fRu5rev and fRu8rev, respectively.