

and in the vicinity of narrow gorges where valley aggradation by the river and mass wastage are accentuated, a number of terraces may be cut entirely in a fill of mixed gravel and colluvium covering an irregular bedrock surface. Downstream the gravel is thinner and subglacial bedrock surfaces are smooth, indicating a greater dominance of lateral planation in terrace formation. Other terrace segments have resulted from piracy and abandonment of the original course of the river. Both in the mountains and basin, colluvial and fan deposits cap the terrace gravels in some localities adding significantly to their height above present stream grade. Related to different load and discharge patterns between the mountains and drier basin, the number of steps in each terrace complex decreases downstream, as do terrace heights above the present river, and the difference in height between the terrace complexes. The Powell terrace persists for approximately 90 miles to the mouth of the Bighorn whereas the Cody merges with the floodplain approximately 12 miles upstream from the mouth.

CRYSTAL CHEMISTRY OF THE CALCIUM IODATES IN THE SYSTEM $\text{Ca}(\text{IO}_3)_2\text{-H}_2\text{O}$

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The three known phases in the system $\text{Ca}(\text{IO}_3)_2\text{-H}_2\text{O}$ are lautarite, $\text{Ca}(\text{IO}_3)_2$, the recently discovered mineral brüggenite, $\text{Ca}(\text{IO}_3)_2\cdot\text{H}_2\text{O}$, and $\text{Ca}(\text{IO}_3)_2\cdot 6\text{H}_2\text{O}$, not yet found in nature. Previous study of this system by Hill and Brown in 1931 showed that in saturated solutions lautarite and brüggenite coexist at 57.5°C , and brüggenite and $\text{Ca}(\text{IO}_3)_2\cdot 6\text{H}_2\text{O}$, at 34.5°C . Lautarite and brüggenite, however, were found to occur together in the Chilean nitrate deposits at temperatures less than 25°C ; the lowering of the activity of water in the brine by other salts is probably responsible for the coexistence of the two minerals, and also for the absence of $\text{Ca}(\text{IO}_3)_2\cdot 6\text{H}_2\text{O}$.

Single-crystal X-ray investigations of the phases in this system yielded these data: synthetic lautarite, $4[\text{Ca}(\text{IO}_3)_2]$, is monoclinic, $P2_1/n$, $a = 7.25 \text{ \AA}$, $b = 11.28 \text{ \AA}$, $c = 7.125 \text{ \AA}$, $\beta 106^\circ 25'$, $D = 4.63 \text{ g/cm}^3$; synthetic brüggenite, $4[\text{Ca}(\text{IO}_3)_2\cdot\text{H}_2\text{O}]$, is also monoclinic, $P2_1/c$, $a = 8.51 \text{ \AA}$, $b = 10.00 \text{ \AA}$, $c = 7.50 \text{ \AA}$, $\beta 95^\circ 20'$, $D = 4.26 \text{ g/cm}^3$; $8[\text{Ca}(\text{IO}_3)_2\cdot 6\text{H}_2\text{O}]$ is orthorhombic, $Fddm$, $a = 14.84 \text{ \AA}$, $b = 22.99 \text{ \AA}$, $c = 6.385 \text{ \AA}$, $D = 3.04 \text{ g/cm}^3$.

Thermogravimetric analyses (heating 4°C/min . in air) show that $\text{Ca}(\text{IO}_3)_2\cdot 6\text{H}_2\text{O}$ dehydrates to brüggenite between 100° and 200°C ; brüggenite dehydrates to lautarite from 220° to 325°C ; lautarite decomposes between 500° and 700°C , probably according to the reaction $5\text{Ca}(\text{IO}_3)_2 \rightarrow \text{Ca}_5(\text{IO}_6)_2 + 4\text{I}_2 + 9\text{O}_2$; $\text{Ca}_5(\text{IO}_6)_2$ decomposes between 750° and 850°C , leaving a residue of CaO . Infrared spectra show normal absorption frequencies for hydrate H_2O in $\text{Ca}(\text{IO}_3)_2\cdot 6\text{H}_2\text{O}$ and brüggenite, and for IO_3^- in all three iodates.

BURIED BASEMENT ROCKS OF NORTH AMERICA: THEIR EVIDENCE FOR CONTINENTAL RIFTING AND DRIFTING

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Distribution of Precambrian rock types, structural, and isotopic age provinces furnish limiting data on intracontinental lateral faulting as well as defining lines for pre-continental drift assemblies. Study of buried basement rocks from North America permits extension of the identifiable geologic and structural provinces of the Canadian Shield