Thermal dehydration of the mineral up to 300° C gave a total loss of water in a single shoulder with a weight loss of 15·8 %. The differential thermal analysis curve obtained with a Eberbach set with the heating rate at 20° C/min gave a weak to medium exothermic peak at 120° C and prominent endothermic peak at 260±20° C. No other reaction is recorded at higher temperatures. These observations are comparable with existing data in the literature for scorodite from Seixeira, Portugal, (Correia Neves, 1960) and aluminian scorodites and mansfeldites from Djebal Debar, Algiers (Caillère and Henin, 1954). The association and occurrence suggest that the mineral was formed in the hydratogenic stage of the pegmatite formation, where the hydrothermal solutions were active.

This paper records for the first time the occurrence of scorodite in Brazil.

Dept° de Mineralogia e Petrografia, A. BHASKARA RAO
 Escola de Geologia de Pernambuco, JOSÉ AFRANIO V. CARNEIRO
  Universidade do Recife,
  Recife, Brazil

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The mineralogical similarity of precious and common opal from Australia

PRECIOUS opal ('colour') exhibits an optical brilliance in contrast to its field associate, common opal ('potch'). Their body colour and translucency, however, are usually similar. To investigate the mineralogical properties of these two types, homogeneous samples of each were taken from the main opal fields of Australia. Only typical material was obtained, which in all cases occurred in sedimentary strata. The samples are a grey translucent precious opal and a black sub-translucent common opal from Lightning Ridge, a milky sub-translucent precious opal and a blue sub-translucent common opal from Coober Pedy, and a clear transparent precious opal and a clear transparent common opal from Andamooka. Each sample was examined firstly by X-ray diffraction

and spectrographic analysis, and subsequently by both thermo-
gravimetric analysis and differential thermal analysis utilizing apparatus
described by Warne and Bayliss (1962).

Each of the six samples gives the same X-ray diffraction pattern;
although each sample was scanned through an angle of 2θ from $2°$ to
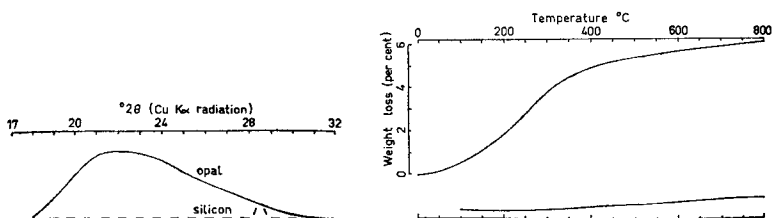
FIGS. 1 and 2: FIG. 1 (left). X-ray diffraction pattern for common opal from Light-
ning Ridge, with silicon pattern (dashed) for comparison. The other samples gave
closely matching patterns. FIG. 2 (right). Thermogravimetric curve (top) and
d.t.a. curve (bottom) for common opal from Lightning Ridge. The other samples
gave closely matching patterns.

$64°$, only the range that shows any diffraction effect (17–$32°$) is shown
in fig. 1, and in order to indicate the peak width of the diffraction band
a dashed line for the silicon pattern is included. This band at $21°$ 2θ
(Cu–$K\alpha$ radiation) is quoted by Frondel (1962) as representing the
X-ray diffraction from randomly arranged silica tetrahedra. The
presence of this band and the non-detection of other reflections indicates
that these opals are amorphous rather than a precursor of the low form
of cristobalite. This agrees with the statement by Jones et al. (1963)
that 'most precious opals are near amorphous'.

Table I lists the elements determined by semiquantitative spectro-
graphic analyses. Although the reliability is only within limits of $2/3$ to
$3/2$ for minor elements and $\frac{1}{2}$ to 2 for trace elements, the values are com-
parable internally.

Since the thermogravimetric curve of each sample is similar, only one
example, namely the curve for the common opal from Lightning Ridge,
is shown in fig. 2. The ignition loss, which is taken from these curves,
is included in table I. The rate of ignition loss reaches a maximum at
$250°$ C, but the last trace of water is not released until $600°$ C.

Only the differential thermal curve of the common opal from Lightning
Ridge is shown in fig. 2, since all the other curves are similar to it. This
curve belongs to Group I in the classification of Jones et al. (1963); this
group, which contains most of the glassy opals including the precious

varieties, is defined by a very small, or by no apparent endotherm between 100° C and 200° C.

TABLE I. Spectrographic analyses of opal

Source	Lightning Ridge		Coober Pedy		Andamooka	
	Precious	Common	Precious	Common	Precious	Common
H_2O	6·0 %	6·1 %	6·4 %	5·9 %	5·7 %	4·9 %
Al_2O_3	2·5	1·6	1·8	1·5	1·3	1·2
Fe_2O_3	0·3	0·2	0·2	0·15	0·2	0·15
TiO_2	0·1	0·04	0·01	0·01	0·01	0·01
ZrO_2	0·02	0·02	0·01	0·01	0·04	0·04
CaO	0·9	0·6	0·8	0·8	0·3	0·2
MgO	0·1	0·04	0·05	0·05	0·05	0·05
Na_2O	0·4	0·15	0·4	0·3	0·05	0·1
MnO	0·02	0·002	0·0015	0·001	0·001	0·001
CuO	0·006	0·01	0·0008	0·0004	0·0004	0·0004
NiO	0·002	0·003	—	—	—	—
CoO	0·0025	0·005	—	—	—	—
Ag_2O	—	—	0·002	0·002	—	—

In conclusion, precious opal is similar to the associated common opal with respect to the following mineralogical properties: X-ray diffraction pattern, trace element content, thermogravimetric curves, and differential thermal curves.

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School of Applied Geology,   P. BAYLISS

   University of New South Wales,   P. A. MALES

     Box 1, Kensington,

      N.S.W., Australia.

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Berek compensator

IN determining the retardation, Γ, of a mineral with a Berek compensator, the expression $\Gamma = C. f(i)$ is used, where C is the compensator constant and $f(i)$ is a function of the average angle of rotation, i, measured from the zero position of the compensator. The values of C and