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SPURIOUS Rb-Sr SYSTEMATICS OF CLAY MINERALS FROM THE POISON CANYON SANDSTONE, GRANTS MINERAL BELT, NEW MEXICO

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Hilpert (1963) defines the Poison Canyon Sandstone as the lowermost sand of the Brushy Basin Member of the Morrison Formation (Late Jurassic). The name, Poison Canyon Sandstone, is considered an informal name of economic usage in the Grants Mineral Belt. It consists of kaolinitized sandstone with smectitic interbeds of possible bentonitic origin. In general, the Poison Canyon Sandstone consists of an upper sandstone (PCU), a marked middle shale with sandy interbeds, and a lower sandstone (PCL). Tessendorf (1980) has described the stratigraphy of the Poison Canyon Sandstone in detail.

The Poison Canyon Mine contains several generations of ore. Early (Late Jurassic?) trend ore has been largely destroyed and redistributed into secondary ores due to encroachment of oxidizing waters onto the primary ore (Tessendorf, 1980; Della Valle, 1980). Much of this redistribution of primary ore is presumed to have occurred during the Late Cretaceous - Early Tertiary (Tessendorf, 1980).

Samples for this brief study were obtained from the Poison Canyon Mine, the location of which is: Latitude N 35°19′35″ and Longitude W 107°49′09″. These samples are designated PCU (Upper Sandstone) or PCL (Lower Sandstone). Two samples were taken from the Poison Canyon Sandstone exposed in the Johnny M Mine at N 35°22′00″—W 107°43′19″. For most samples, the minus-two micron fraction containing authigenic clay minerals was separated for XRD and Rb-Sr isotopic study, and the data are presented in table 1a. Some mudstone samples were treated as whole rocks for XRD and Rb-Sr analyses, and the data presented in table 1b. Standard methods were used for clay mineral separation, x-ray diffraction (XRD), and Rb-Sr analytical techniques (see Della Valle, 1980; Brookins, 1980). The decay constant for ^{87}Rb was taken as 1.42×10^{-11}/y. Most of the samples are kaolinite rich, although a few are rich in mixed layer smectite/illite.

Brookins (1980) has previously noted the difficulty in working with samples of authigenic clay minerals rich in kaolinite. The data of table 1 are presented in graphical form in figure 1 only for convenience to illustrate that they do not define any clear isochron(s). Two reference isochrons are presented as well. It is probable that the events associated with the destruction of the primary ore and formation of the redistributed ores have led to a heterogeneous mixture of primary clay minerals Rb-Sr

TABLE 1. Rb-Sr data for Poison Canyon area samples.

Sample	Rb (ppm)	Sr (ppm)	$^{87}Sr/^{86}Sr$	$^{87}Rb/^{86}Sr$	Dominant clay mineral (%)
a. Clay mineral, minus-two micron fraction					
PCL-2 B	81.05	121.34	0.7168	1.94	NA
PCU-3	89.65	46.30	0.7178	5.61	K, 64%; m: S, I, S/I
PCU-10	106.15	39.61	0.7152	7.76	S/I, 78%; m: I
PCU-8	91.59	94.98	0.7137	2.79	K, 54%; m: I
DLQ-Jmpc-3	76.70	61.34	0.7146	3.62	NA
Jmpc-1	88.48	66.34	0.7160	3.68	NA
PCL-1	61.84	25.80	0.7229	6.95	K, 89%; m: S
PCL-6	108.06	45.37	0.7283	11.51	NA
PCU-2	63.86	57.70	0.7176	3.21	K, 59%; m: I, S, S/I
PCL-4	52.48	229.25	0.7218	5.20	K, 86%
PCU-9	80.46	41.73	0.7145	5.59	S/I, 54%; m: S, I
b. Whole rocks					
PCL-3 WR	72.82	34.78	0.7245	6.07	NA
PCL-8	76.89	43.53	0.7373	5.13	K, 98%
PCL-11	54.339	21.85	0.7218	7.22	NA
PCU-2 A	78.68	39.37	0.7256	5.80	NA
PCU-12 WR	98.00	36.89	0.7192	7.70	S/I, 53%; m: I

Notes: 1. Clay minerals by XRD
2. K = Kaolinite, S/I = mixed layer smectite/illite, I = illite
3. m = minor
4. NA = not available

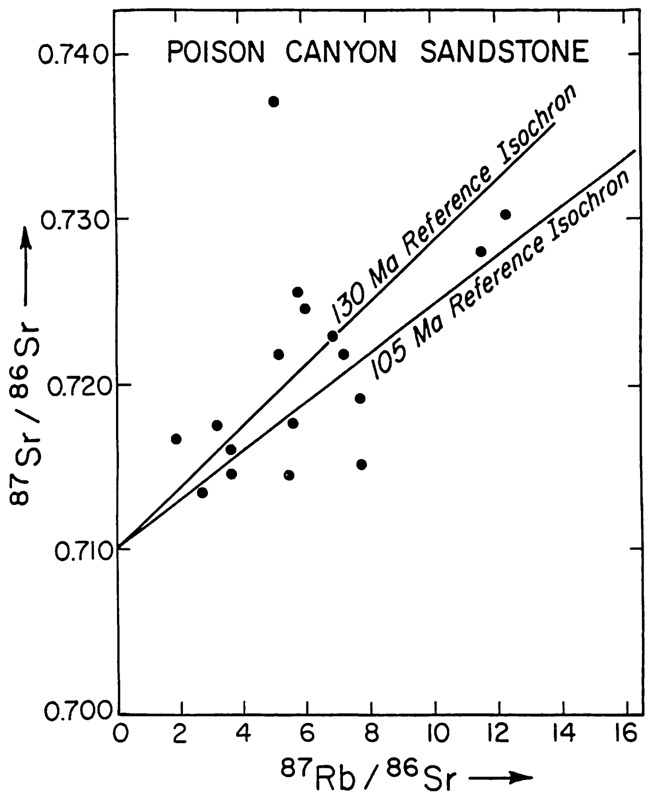

FIGURE 1. Plot of $^{87}Sr/^{86}Sr$ vs. $^{87}Rb/^{86}Sr$ data for Poison Canyon clay minerals and some whole rocks. Two reference isochrons are shown.

systematics being incompletely, and non-uniformally, reset, along with variable $^{87}Sr/^{86}Sr$ sources associated with secondary generation clay minerals.

The lack of internal isochrons supports Brookins (1980) thesis on the suitability of kaolinite-rich samples for meaningful Rb-Sr geochronologic studies in Morrison Formation rocks.

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