^{87}Rb-^{87}Sr and K-Rb-Sr-Ba rare earth element contents of the Luna 20 and Apollo 15-16-17 soils and rocks.

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^{87}Rb-^{87}Sr ages are determined for Luna 20, Apollo 15 and 16 rocks, soils and fragments, and if the samples are available for Apollo 17 rocks. The Apollo 15 rocks give ages between 3.25 and 3.35 BY and preliminary Apollo 16 results indicate a 3.9 BY age ($\lambda = 1.39\ 10^{-11}\ y^{-1}$). The soils have a model age of 4.65 $\pm$ 0.3 BY, taking ADOR as the initial ratio of ($^{87}Sr/^{86}Sr$) for the Moon. These data give the impression that in the soils there is a component highly enriched in Rb and which was formed early in the lunar history.

The K,Rb,Sr,Ba and REE data for the rocks and fragments indicate the presence of at least two types of basalts, one with REE chondritic normalized concentrations of 10 to 20 and with a small negative europium anomaly and the other with REE chondritic normalized concentrations of 3 to 5 and with a positive europium anomaly. The soils give the impression of being a mixture of these two types of rocks with at least a third component rich in KREEP. This component is more important in the Apollo 15 and 16 samples than in the Luna 20 or Luna 16 samples. Correlation diagrams, like (Sr,Sm) or (Eu,Sm), suggest strongly that the basalts are contaminated by an acidic crust. This contamination is also evident from ionic micro-analyser pictures.

Trace element concentrations, in particular the REE concentrations, calculated for a primitive moon, show a nearly uniform enrichment of 5 to 7 times over the corresponding chondritic concentrations. Recently exposed rocks from the earth mantle show also a flat chondritic normalized REE distribution pattern, but in this case the enrichment is only a factor of 2. However, earth mantle rocks of 2 to 3 BY show besides the flat pattern, an approximate 4 times enrichment over chondritic values. Hence when one compares earth mantle rocks with estimated lunar mantle rocks of similar age one notices that their REE abundances are not very different , contrary to some previous predictions . A model for the chemical evolution of the moon will be proposed.