

## **RARE EARTH ELEMENT (REE) CONTENTS OF GEOTHERMAL FLUIDS FROM SELECTED GEOLOGIC ENVIRONMENTS**

Wood, S.A., Shannon, W.M., Brown, K., Arehart, G., University of Idaho, Dept. Geology, Moscow, ID, 83844-3022, USA

The systematics of REE in geothermal fluids may represent an additional tool in the exploration for and exploitation of geothermal fields of economic importance. We measured the REE content of fluids from a variety of geothermal systems and relate REE contents to such parameters as fluid chemistry and the type of host rock. We collected filtered anion and cation samples, and both filtered and unfiltered REE samples. Temperature, conductivity, and pH were measured in the field. The REE, Th, and U are collected by co-precipitation with ferric iron and determined by ICP-mass spectroscopy. We have demonstrated sample detection limits better than 0.01 ug/L or 0.05 nmole/Kg for most of the REE's, Th and U. We present REE results from geothermal areas in the Taupo Volcanic Zone, New Zealand, the Eastern Cascades, Oregon, the Alvord Desert and Harney Basin areas of Southwestern Oregon, and Dixie Valley and Beowawe, Nevada. Measured REE contents range from 0.000002 to 0.2 times chondritic. Geothermal fluids with low pH have elevated REE, with chondrite normalized patterns resembling typical host rocks. Near-neutral and higher pH fluids have much lower REE contents, variable slopes of chondrite-normalized patterns, and higher REE in unfiltered than in filtered fractions. This suggests that some portion of available REE are absorbed onto suspended solids. Modeling of REE speciation and solubility of REE-minerals is used to elucidate controls on REE concentrations in geothermal fluids.