Goldschmidt 2026 Abstract
https://doi.org/10.46427/gold2026.38124

Geochemical Characteristics of Thermal Fluids in the Lushan Field, Taiwan

SHENG-RONG SONG[1], TING-JUI SONG[2] AND YI-CHIA LU[3]

[1]Department of Geosciences, NTU
[2]Department of Earth Resources Engineering; Kyushu University, Japan
[3]National Central University

A systematic geochemical investigation was conducted in the Lushan area, covering five major hot spring zones - Chunyang, Tailuwan, Mahebo, Lushan Hot Spring Gead, Taiuowan Creek, and Jingying, with a total of 40 water samples collected for analysis. The basic physicochemical properties of the water samples reveal significant temperature variations among the different hot spring areas. The highest temperatures were recorded at Lushan Hot Spring Head and Mahebo, where spring temperatures exceed 90 degree C, and some wells reach up to 98 degree C. In the Chunyang area, a 150-m shallow well produced water with temperature of 78.9 degree C and a bottom-hole temperature of approximately 94 degree C, indicating considerable geothermal potential. Overall, a clear trend is observed: higher water temperatures correspond to increased TDS, salinity and electrical conductivity, while resistivity decreases. The relationship reflects enhanced mineral dissolution in deeper circulationg thermal fluids. In contrast, the Jingying hot spring area exhibits lower temperatures and TDS values due to significant mixing with meteoric water.

Integrating hydrochemical and isotopic evidence, the hot spring waters in the Lushan area are interpreted to originate from meteoric water that infiltrate into the subsurface, undergoes deep circulating and heating, and experiences prolonged water-rock interaction before ascending along faults or fractures to the surface. High-temperature areas such as Lushan Hot Spring Head, Mahebo and Chunyang are cheacterized bu elevated TDS and Na-HCO3 concentrations, indicating higher reservoir temperatures and greater circulation depths. In contrast, the Jingying hot spring area is strongly influenced by shallow mixing processes and therefore exhibits relatively lower geothermal potential.