TOPOLOGICAL RELATIONS IN THE SYSTEM U-Si-O-H FORMED DURING THE WEATHERING OF THE ALBITITE-TYPE URANIUM CACHOEIRA DEPOSIT, CAETITÉ, BAHIA, BRAZIL

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RESUMO: The alteration pattern at the Cachoeira Mine due to weathering results in the formation of uranophane [Ca $(UO_2)_2(SiO_3)2(OH)_2$], soddyite $[(UO_2)_5(SiO_4)_2(OH)_2.5H_2O]$, kasolite Pb $[UO_2)(SiO_3)(OH)_2$ with very subordinate amounts of coffinite $[USiO_4)_{0.5}(OH)_2]$, formed under high silica activity. Hydration of primary uraninite or secondary pitchblende, which could be partly destabilized during weathering, under silica- and/or water-rich conditions form the encountered mineral association. Nine key reactions have been assembled in μSiO_2-μH_2O diagram: uraninite + ½ SiO_2 + H_2O = coffinite (1); 2 uraninite + 2 SiO_2 + 6 H_2O = uranophane (2); uraninite + SiO_2 + H_2O = kasolite (3); 5 uraninite + 2 SiO_2 + 6 H_2O = soddyite (4) ; uranophane = 2 soddyite + 4 H_2O (5); uranophane = 2 coffinite + SiO_2 + 4 H_2O (6); soddyite + 3 SiO_2 = 5 kasolite + H_2O (7); 4 coffinite + H_2O = soddyite + SiO_2 (8); coffinite + ½ SiO_2 = kasolite (9). It could be shown that increasing μH_2O would make stable uranophane. Under silica-rich conditions kasolite and uranophane form and moderate μSiO_2-μH_2O soddyite and coffinite are the stable phases. Although it is difficult to detect and recognize other phases such as becquerelite [Ca $(UO_2)_6O_4$ $(OH)_6(H2O)_8$], sklodowskite $[Mg[UO_2)_2(SiO_3)_2(OH)_2.5H_2O]$ and schoepite $[(UO_2)_8O_2(OH)_{12}.(H_2O)_{12}]$ because they are poorly crystallized or amorphous, eventually they could exist and included in the reaction set, enlarging the number of reactions to twenty one. The uranyl oxyhydroxides form in U-rich aqueous condition through oxidation and hydration of uraninite. In that way, all eight mineral phases may be represented in a single diagram. Increasing μH_2O favor stability of becquerelite, which under still higher H_2O conditions yield to schoepite. Increasing both H_2O and silica, sklodowskite must form. As these minerals still have not been positively found at Cachoeira, we assume that high silica/H_2O ratio prevailed

PALAVRAS-CHAVE: TOPOLOGY; U-SECONDARY MINERALS; MINE 13-CACHOEIRA.