Characterization of Coals from the Candiota, Butiá-Leão and Santa Terezinha Coal Deposits, Rio Grande do Sul, Brazil

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Comprehensive characterization has been initiated on 51 samples of Brazilian coal from active mines in the state of Rio Grande do Sul, Brazil (Candiota, Butiá-Leão) and of deep-lying coal seam from the Santa Terezinha area. Preliminary data on several samples indicate that these typically high ash (> 40 wt % ash on an as received basis) coals do not have exceptionally high concentrations of elements of environmental, technologic, or economic interest. X-ray diffraction analysis indicates that kaolinite is the dominant mineral in the low temperature ash with subordinate quartz, minor pyrite and illite, and trace amounts of other minerals. Selective leaching results indicate that many elements (Li, Be, Mg, Al, K, Sc, V, Cr, Rb, Sn, and U) are primarily (>50%) associated with silicates such as the clays. Fe, Cu, Zn, As, Se, Sb, Tl, and Pb are associated with the sulfides (pyrite and chalcopyrite were observed by SEM). Ca and Mn are associated primarily with the carbonate minerals (calcite and siderite). Several elements (Co, Ni, Mo, Ba, Sr, Cs, and Rb) have multiple associations. Accessory minerals such as rare-earth bearing phosphates (monazite, xenotime, and others), zircons, and titanium oxides are common. Sodium is in ion-exchangeable sites. The petrographic, chemical and mineralogical characteristics of the coals have also been determined.