

Environmental characterization of mine waste at the Pb–Zn Sidi Kamber abandoned mine (NE Algeria)

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The mining wastes coming from Sidi Kamber mine stored at the surface are exposed to weathering conditions, which favour the leaching of toxic metals into the environment. This situation presents serious risks for humans and ecosystems. To better understand this problem, eight representative samples of Sidi Kamber mine tailing were taken from the surface along two vertical trenches and tested using static and dynamic leaching tests. The studied samples present a wide diversity in terms of particle size distribution, mineralogical and chemical compositions. These parameters may greatly affect the reaction rates. The mineralogical investigations show the presence of various sulphide minerals, such as pyrite, galena, sphalerite and chalcopyrite which are present in either free and/or associated with gangue minerals (i.e. quartz, albite, chlorite and muscovite). Moreover, the presence of only minerals with low neutralizing potential such as silicates, promotes the acid mine drainage generation, which is characterized by high concentrations of metals and sulphates. Leaching tests showed an acidic pH and the release of some toxic contaminants (i.e., Pb, Zn and Cu), which exceed the recommended limits (Algerian regulation law for industrial wastewater and US EPA thresholds).

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