ABSTRACT

When the shale gas is extracted, various fluids for hydraulic fracturing are used. They contain several hundred different chemical compounds. Many of them may have a negative effect on the environment and human health. Even though the chemical additives make up only 2% of the fluid volume, the large fluid amount used and the fact that most of these substances are highly toxic make them a potentially high threat to the environment. To reduce their negative environmental effect, it is necessary to identify all the compounds with the product safety data sheets and to define their toxicity levels. Their use should also be reduced as much as possible or they should be replaced with similar substances that are less toxic. The following study concerns the most important chemical additives used in the fracturing fluids during the shale gas extraction. It focuses on their properties and toxicity, and defines the problems related to the determination of microelements and macroelements present in samples with such complex matrices. Additionally, the risks related to their application and migration to soils, surface water, ground water and organisms are described.

Keywords: Fracturing fluid; Shale gas; Chemical substances; Environmental threats