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Degassing of sulfur dioxide during acid pyrite leaching: consequences on oxygen and sulfur isotope composition and S:Fe stoichiometry of solution chemistry

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Abiotic and microbial leaching of pyrite in acid environments produce non-stoichiometric sulfur : iron ratios in the solution, i.e. S:Fe ratios smaller than 2. It has been speculated that degassing of sulfur dioxide may be the cause of this puzzling phenomenon. We collected the gas from the headspace of experiments where pyrite was exposed to HCl (buffered at pH 2) and found that sulfur dioxide indeed was present. We estimate the quantity of degassing of sulfur dioxide, its sulfur isotope composition and discuss the consequences for the sulfur and oxygen isotope composition of the sulfur species in solution.