Pyrite development within volcanic hosted petroleum reservoirs

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Within petroleum systems pyrite framboids are commonly found in the organic-rich source rocks, where they are interpreted as having formed during diagenesis, through biogenic reduction of pore-water sulphate. In the course of the study of a sequence of volcanic and sedimentary rocks of the Early Cretaceous back-arc basin of central Chile, I have documented the presence of abundant pyrite framboids associated dominantly with a degraded petroleum reservoir. The pyrite-rich petroleum, now bitumen, occupies primary and fracture porosity in volcanic reservoir rocks, rather than in the underlying sedimentary source rocks.

The petrology of the rocks and sulphur isotope data indicate that the pyrite framboids developed within the petroleum reservoir as a result of sub-surface biodegradation.