CRYSTAL-FIELD-DRIVEN REDOX REACTIONS: HOW COMMON MINERALS SPLIT H₂O AND CO₂ INTO REDUCED H₂ AND C PLUS OXYGEN

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It is difficult to prove the presence of molecular H₂ and reduced C in minerals containing dissolved H₂ and CO₂. We developed a new technique by which we can unambiguously show that minerals grown in viciously reducing environments contain peroxy in their crystal structures. These peroxy represent interstitial oxygen atoms left behind when the solute H₂O and/or CO₂ split off H₂ and C as a result of internal redox reactions, driven by the crystal field. The observation of peroxy affirms the presence of H₂ and reduced C. It shows that the solid state is indeed an unusual reaction medium.