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A mineralogical and geochemical record of atmospheric photochemistry

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ABSTRACT

Unanticipated discoveries of new examples of natural phenomena punctuate the history of science with excitement and afford splendid opportunities for ground-breaking, systematic research. And so it is with the near-simultaneous discoveries of non-mass dependent fractionation of O isotopes (Bao et al. 2000b) and of S isotopes (Farquhar et al. 2000a) in terrestrial surface deposits. The discoveries set the stage for members of the Mineralogical Society of America, including geochemists, mineralogists, mineral physicists, and petrologists, to investigate a geologic record of atmospheric photochemistry across the entire span of Earth's lifetime, from the Archean to the present day. The significance of such breakthrough research to humankind is apparent in the essential role played by atmospheric photochemistry in generating the ozone shield, so necessary for sheltering life from solar ultraviolet radiation, and in its possible part in the origin of life itself by shaping Archean pre-biotic chemistry.