

AN OLIVINE-RICH EARTH-CROSSING ASTEROID: SOURCE OF PALLASITES?;
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A few asteroids were classified in 1983 as constituting a unique spectral class, "A", on the basis of colorimetry (1). Cruikshank and Hartmann (2) obtained infrared spectra of two of these, finding that they are dominated by the olivine absorption band, entirely lacking the pyroxene band commonly found in olivine-bearing meteorites. This was the first recognition of dunite-like composition in asteroids; Cruikshank and Hartmann suggested the objects might be exposed asteroid mantles and/or parent bodies of pallasite (olivine + metal) stony-iron meteorites. Bell, Hawke, and Gaffey (3) later identified one more class A object as having this composition.

In 1984, we (DPC, WKH, DT) obtained spectra of Earth-crossing asteroid 1982 RA, showing that it also belongs to this class. Bell has found that the shape of the 1982 RA olivine feature can be simulated by coarse-grained >1 mm olivine on an iron substrate.

These findings are especially interesting because they are the first detection of the olivine-dominated (pallasite-like?) chemistry in an Earth-crosser. They may mark the first spectral evidence of an immature (coarse-grained) or even non-existent regolith on an asteroid. Finally, they may mark identification of a possible parent body for some pallasite meteorites.

References

- (1) Veeder, G., Matson, D., and Tedesco, E. (1983). Icarus **55**, 177.
- (2) Cruikshank, D. and Hartmann, W. (1984). Science **223**, 281.
- (3) Bell, J., Hawke, R., and Gaffey, M. (1984). Bull. AAS **16**, 708.