THE APOLLO 17 DRILL CORE: GLASS CHEMISTRY AND INTRACORE DISTRIBUTIONS (SECTIONS 70007, 70008, 70009); D. T. Vaniman and J. J. Papke, Dept. of Earth and Space Sciences, State Univ. of New York, Stony Brook, N. Y. 11794

INTRODUCTION. It is well known that soils in the Valley of Taurus-Littrow, Apollo 17, are enriched in a high-Ti orange glass and a black glass devitrified equivalent; these orange/black glasses have been well characterized by numerous investigators. However, what is less well known is that significant amounts of clear, yellow/green and gray/brown glasses also occur in these soils. This study provides a modal and chemical characterization of the entire glass population that occurs as optically and chemically homogeneous beads or portions of beads; agglutinates, for example, are not considered in the chemical study. Details of the modal study are provided in a companion paper by Papke et al. (1) and characterization of the monomineralic and lithic component by Vaniman and Papke (2). The modal abundances and intracore variations of the glass color groups are summarized in Fig. 1; chemical systematics based on 275 microprobe analyses* are summarized in the bivariate oxide plots of Figs. 2-5.

MODAL ANALYSES. Modal distributions were determined by counting 2000 grid points on each of 31 thin sections and 1000 grid points on each of four smaller thin sections. Thus, 66,000 points were optically characterized in this study. The modal differentiation of the glasses was based on color with orange/black, yellow/green, clear, brown and gray groups being distinguished. Orange and black glasses are identical in composition; black glass represents the devitrified equivalent of orange. Since the modal analyses reported in this study were carried out with transmitted light optics we had some difficulty with the assignment of broken fragments of black glass; most have been assigned correctly to the orange/black category while others were undoubtedly assigned to the opaques category. Thus, it is safe to assume that our modal proportions of orange/black glass are underestimates. The yellow/green glasses include distinctly yellow and green beads as well as many with yellow-green transitional coloration. Microprobe analyses indicate that these groups overlap and thus they have been combined in our diagrams.

Our modal stratigraphy (1) coincides with the x-radiographic stratigraphy reported in LSPET (3) and Duke and Nagle (4) in the recognition of a coarse-grained unit (x-ray unit 59) at a depth of 17.5 - 79 cm. This unit may represent ejecta from Camelot Crater or another crater of the Central Cluster (3). Although the coarse unit is not sharply distinguished from the strata above and below by any abrupt change in glass content or composition, we do see a build-up of orange/black glass abundance in a portion of section 70008 that has the lowest matrix proportion.

CHEMISTRY.

Mare Glasses (Orange/Black) and Highland Glasses (Clear). Although the glass color groups provide a first order chemical discrimination, certain color groups are far more compositionally constrained than others. Orange/black glass (Figs. 2-5) forms a tight cluster near the composition determined by Rhodes et al. (5). Clear glasses are also chemically distinctive with low TiO₂ (<2%) and with a CaO/Al₂O₃ weight ratio of highland plagioclase (≈ 0.575). These glasses range from KREEP with Al₂O₃/SiO₂ (≈ 0.18) to HASP (6) with Al₂O₃/SiO₂ (≈ 1.17). Two high-alumina silica-poor glasses (HASP, ref. 6) have

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Fig. 2

**LEGEND**

- Apollo 17 high-Ti subfloor basalt of Rhodes et al. (1974)
- **GLASS COLOR GROUPS:**
  - Clear
  - Brown
  - Clear HASP
  - Yellow / Green Cluster
  - Apollo 17 Orange
  - Apollo 17 Green

Fig. 3

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been identified in this study: one above the coarse-grained unit (P.T.S. 70009, 294) and one below this unit (P.T.S. 70007,328).

Soil Glasses (Brown) and Mixed Origin Glasses (Yellow/Green). Brown glasses generally fall in the range of the Apollo 17 soil types described by Rhodes et al. (5) and are probably generated locally by impact melting of the regolith. Yellow/green glasses fall between the high-Ti orange glasses and the glasses of the highland trend. Although these glasses constitute a diffuse and dispersed group, one subgroup of the yellow/green glasses forms a distinctive compositional cluster with SiO$_2$ $\sim$ 45.5%, TiO$_2$ $\sim$ 0.8%, Al$_2$O$_3$ $\sim$ 10%, FeO $\sim$ 19%, MgO $\sim$ 14% and CaO $\sim$ 10%. It is tempting to speculate that this compositional cluster represents a very low-Ti mare basalt component in the Apollo 17 soils. See Vaniman and Papike (2) for the description of lithic representatives of very low Ti mare basalts at this site.

Analyses from p.t.s. 70009,288; 70009,292; 70009,294; 70008,354; 70008, 356; 70008,362; 70008,370; 70008,376; 70007,312; 70007,314; 70007,320; 70007,324; 70007,328 and 70007,332.

REFERENCES