THE FALL, RECOVERY AND CLASSIFICATION OF THE PARK FOREST METEORITE. S. B. Simon[1], J. F. Wacker[2], R. N. Clayton[1,3], T. K. Mayeda[3], J. R. Schwade[4], P. P. Sipiera[4], L. Grossman[1,3] and M. Wadhwa[5]. [1]Dept. of the Geophysical Sci., 5734 S. Ellis Ave., The Univ. of Chicago, Chicago, IL 60637; [2]Pacific NW Nat. Lab., Richland, WA 99352; [3]Enrico Fermi Inst., Univ. of Chicago; [4]Planetary Studies Foundation, Crystal Lake, IL 60014, [5]The Field Mus., Chicago, IL 60605. (sbs8@midway.uchicago.edu)

Introduction: On March 26, 2003, at ~23:50 CST, a fireball lit up the sky, accompanied by detonations loud enough to waken sleepers. Meteorites shattered windows and pierced roofs in and around Park Forest, ~40 km south of Chicago. Park Forest police brought specimens to their station and asked residents to do the same. Specimens were brought in for several days. So far, >40 find sites, mostly in Park Forest, have been identified. The strewnfield extends from Crete, IL in the south to Olympia Fields, IL, in the north, a distance of ~8 km. Fragments range from pebble-sized to 2.7 kg. The total mass of these individuals is ~18 kg. Additional specimens probably fell in a heavily-wooded forest preserve; others were sold before their weights and locations could be recorded.

Sample Description: Individuals range from completely fusion crust-covered to nearly fusion crust-free. The rock is a breccia, consisting of angular, light-grey clasts enclosed in a dark matrix. Most specimens are dominated by the former or contain both lithologies; a few are dominated by the dark lithology. Anhedral grains of metal and sulfide visible to the naked eye are present in both lithologies.

Analysis: A 232-g specimen was coincidence-counted for cosmogenic radionuclides on a high-efficiency NaI(Tl) γ-spectrometer for 7727 min beginning at 17:19 CST on March 29th. Absorption corrections were made against mockup meteorites. Activities were very low for ^{56}Co (~0.1 dpm kg^{-1}), indicating an interior specimen, high for ^{26}Al (69±4) and ^{60}Co (66±3) and normal for ^{22}Na (95±5).

Polished thin sections of both lithologies were studied optically and with the SEM, and analyzed by electron probe. The two lithologies have the same mineralogy and different textures. Both are dominated by anhedral olivine (ol), low-Ca pyroxene (pyx), troilite and Fe-Ni metal. High-Ca pyroxene and sodic plagioclase (now maskelynite) are sparse and typically 40-50 μm. Accessory phases are chromite and Ca-phosphate. Barred and porphyritic ol chondrules, 600 μm to 1800 μm across, are present in both lithologies and range from distinct to barely visible. The light lithology is coarser-grained, with ol and pyx grains mostly >200 μm across. Some clasts contain dark melt veins. The dark lithology has ol and pyx mostly <150 μm across, and a fine network of sulfide-rich veinlets like those in some black chondrites. Within error, the two lithologies have identical mineral and oxygen isotope compositions. The average fayalite content in olivine (286 analyses) is 24.7 mole % (1σ = 1.1); average ferrosilite content in pyroxene (211 analyses) is 20.7 mole % (1σ = 0.6). Bulk $\delta^{18}O$ = +4.69‰, $\delta^{17}O$ = +3.44‰ (L chondrite fall average: $\delta^{18}O$ = +4.70‰, $\delta^{17}O$ = +3.52‰ [1]).

Discussion: The average olivine, low-Ca pyroxene and O-isotope analyses show that Park Forest is an L chondrite, and that its light and dark lithologies are related. The latter is likely a sulfide-dominated partial impact melt of the former. From the homogeneity of the phases, the degree of preservation of chondrules, and the grain sizes of diopside and maskelynite, we classify it as a type 5. The presence of maskelynite, along with planar deformation features and opaque shock veins, indicates the shock stage is S5 [2]. The ^{60}Co and ^{26}Al data indicate a preatmospheric mass ≥500 – 1000 kg.

References: [1] Clayton R. N. et al. (1991) *GCA, 55,* 2317-2337. [2] Stöffler D. et al. (1991) *GCA, 55,* 3845-3867.