Plate 1. Thin section crossed polarized light photomicrographs of primitive achondrites. (a) The Kenna monomict ureilite. The image shows triple junctures between olivine and pigeonite (pyroxene) crystals and the dark areas are graphite. (b) The Acapulco acapulcoite, showing fine-grained equigranular orthopyroxene, olivine, feldspar, and metal. (c) The Lodran lodranite, which has mineralogy similar to the acapulcoites (b) but is coarser-grained. (d) The Brachina brachinite, showing medium-coarse-grained equigranular texture of olivine, augite, and plagioclase. (e) The Winona winonaite, showing fine-grained equigranular olivine, orthopyroxene, Ca-pyroxene, and plagioclase.

Accompanies chapter by Weisberg et al. (pp. 19–52).
Plate 2. Thin section crossed polarized light photomicrographs of achondrites (a) Ibitira showing a eucrite, which is a vesicular basalt; the large dark areas in the image are vesicles; (b) the Bholgati howardite, which is a breccia of eucritic and diogenitic clasts; (c) the Johnstown diogenite, which consists mostly of orthopyroxene; (d) a region from the Vaca Muerta mesosiderite, showing a mixture of silicate and metal; (e) the Sahara 99555 angrite (in plane polarized light), showing an intergrowth of zoned Ca-Ti-rich pyroxene, Ca-rich olivine, and anorthite; (f) the Pena Blanca Spring aubrite, which is a breccia composed mostly of enstatite and enstatite-rich clasts.

Accompanies chapter by Weisberg et al. (pp. 19–52).
Plate 3. (a) Oxygen three-isotope diagram showing the O-isotopic differences among the chondrite clans and groups and the fields in the diagram occupied by each group. (b) A portion of the diagram shown in (a) enlarged to show the region in which O, E, and R chondrites occupy on the diagram. (c) Oxygen diagram showing the differences among and the regions of the diagram occupied by the achondrite and primitive achondrite clans and groups. (d) A portion of the diagram shown in (c) enlarged to show the region the ureilites and other achondrites occupy on the diagram. The ureilites are primitive achondrites that plot along the slope-1 CCAM mixing line. Because meteorite groups occupy specific regions on the diagram, O isotopes have become a powerful tool for classifying meteorites. Additionally, they can help reveal relationships among meteorite groups, such as the CR, CB, and CH chondrites, which form the CR clan. TF — terrestrial fractionation line; CCAM — carbonaceous chondrite anhydrous mineral mixing line; CR — CR mixing line. Symbols for the achondrite groups are the same as in Fig. 1. IAB, IIIAB, IVA, IICD, and IIE are iron meteorite groups. IRA are ungrouped irons. Data are from Clayton et al. (1984) and Clayton and Mayeda (1996, 1999) and references therein.

Accompanies chapter by Weisberg et al. (pp. 19–52).
Plate 4. Combined elemental maps in Mg (red), Ca (green), and Al (blue) Kα X-rays of the CV carbonaceous chondrites (a) Allende (CV_{oxA}), (b) Kaba (CV_{oxB}), (c) MET 00430 (CV_{oxA/B}), and (d) Leoville (CV_{red}). The CV chondrites contain large Ca,Al-rich inclusions (CAIs), mostly magnesian, porphyritic chondrules (chd), and fine-grained matrix (mx), and show large variations in chondrule/matrix ratios (0.5–1.2). Matrices in the oxidized CVs contain higher abundance of Ca,Fe-pyroxene ± andradite nodules (green spots) than the Leoville matrix.

Accompanies chapter by Weisberg et al. (pp. 19–52).
Plate 5. Combined elemental maps of the (a) CR carbonaceous chondrite PCA 91082, (b) CH carbonaceous chondrite PAT 91546, (c) CBa carbonaceous chondrite Gujba, (d) CBb carbonaceous chondrite Hammadah al Hamra 237, and (e) ungrouped carbonaceous chondrite LEW 85332. The CR chondrite PCA 91082 (a) contains large porphyritic, metal-rich (mt), magnesian (type I) chondrules, heavily hydrated fine-grained matrix, and rare anorthite-rich chondrules (ARC) and CAIs. Many chondrules are surrounded by coarse-grained, igneous rims. The CH chondrite PAT 91546 (b) contains abundant small chondrules and chondrule fragments, FeNi-metal grains, and CAIs. Interchondrule matrix material is virtually absent; heavily hydrated matrix lumps (mx) are present instead. Most chondrules are FeNi-metal-free and have cryptocrystalline (CC) and barred olivine textures; chondrules of porphyritic textures (PO) are rare. The CBa chondrite Gujba (c) consists of large chondrule fragments with cryptocrystalline and very fine-grained textures, and FeNi-metal grains. The CBb chondrite Hammadah al Hamra 237 (d) contains abundant FeNi-metal, chondrules, and rare CAIs. Chondrules have either cryptocrystalline (reddish colors) or skeletal olivine (bluish colors) textures. Matrix material is absent. (e) The ungrouped chondrite LEW 85332 contains largely porphyritic chondrules, rare CAIs, and hydrated matrix material.

Accompanies chapter by Weisberg et al. (pp. 19–52).