Calculated Stability Relations in Systems of Solar Composition at Various Total Pressures (cordierite & sapphireine suppressed; vapor always present)
Plate 7. Stability of condensed phases with temperature and pressure in a vapor of solar composition. The temperatures below which metal, olivine, and orthopyroxene are stable are shown as a function of pressure, dashed, dash-dot-dot, and dash-dot lines, respectively. At pressures > 10−2.5 bar, liquids, primarily of CMAS composition, become stable. The feldspar here is nearly pure orthoclase (Albite). Each of the three traces demonstrates certain analogies to FeO-bearing component in contrast to Mg-bearing. The system cools, and FeO (see Plate 8). At 10−2.5 bar, melilite-orthopyroxene, and Al-spinel are stable. At 10−2.5 bar, olivine and metal will condense, and the system will become stable. At 10−2.5 bar, all liquid will condense, and the system will become stable. At 10−2.5 bar, all liquid will condense to solids, and the system will become stable. At 10−2.5 bar, all liquid will condense to solids, and the system will become stable. At 10−2.5 bar, all liquid will condense to solids, and the system will become stable.
Plate 8. Stability of feldspar at low total pressure, in a vapor of solar composition. This is a detail of Plate 7. The stable solids at $P_{\text{tot}} = 10^{-7.75}$, as Si and Mg condense from vapor as the system cools, are perovskite + melilite + hibonite; melilite + hibonite + Ca-pyroxene; melilite + Ca-pyroxene + Al-spinel + feldspar; melilite + Ca-pyroxene + feldspar (as at 6); Ca-pyroxene + feldspar; Ca-pyroxene + Al-spinel; Ca-pyroxene + Al-spinel + olivine. At $P_{\text{tot}} = 10^{-6.5}$, as the system cools, assemblages are perovskite + melilite + hibonite; melilite + Ca-pyroxene + Al-spinel; melilite + Ca-pyroxene + Al-spinel + olivine. Accompanies chapter by Ebel (pp. 253–277).
Plate 9.  (a) Stability of Ti-bearing phases, and selected other phases, in a vapor of solar composition with C added to increase the C/O ratio. (b) Detail of phase stability at high C/O ratio, as excess C condenses as graphite. Circled numbers in (a) are: At ①, C/O ~ 0.967, 1400 K, CaS (oldhamite) is stable, with TiN (osbornite), as well as hibonite and metal alloy. At ②, 120º lower, Ti is in spinel solid solution, TiN, and perovskite, and Ca is in melilite. Melilite is stable over a successively smaller T region up to C/O ~ 1.01. At ③, C/O = 0.905, 1180 K, Ti is in spinel, Ca-pyroxene, and TiN, coexisting with olivine, metal, and CaS. At ④, and ⑤, Ti is in spinel and TiC, while at ⑥ all the Ti is in TiC. Metal coexists with Fe3C (cohenite) at all three points. At ⑦, olivine and CaS are also stable; at ⑧, SiC and AlN; and at ⑨, olivine, spinel, SiC, CaS, graphite, and Cr3C2. Field boundaries for AlN and Cr3C2 are not shown.

Accompanies chapter by Ebel (pp. 253–277).
Calculated Phase Relations in Systems Enriched in Chondritic Dust, at $P_{\text{tot}} = 10^{-3}$ bar (vapor always present)

- **Corundum**
- **Hibonite**
- **Grossite**
- **Grossite + Perovskite**
- **Grs + Prv + CA1**
- **Prv + Grs + Mel**
- **Prv + Mel + Al-spinel**
- **Mel + Al-spinel + Met + Olv + Ca-px**
- **Met + Olv + Ca-px + Fsp**
- **Met + Olv + Ca-px**
- **Orthopyroxene + Cr-spinel + Feldspar + Ca-pyroxene**
- **MnTiO$_3$ Oxide**
- **MnO**
- **FeS**

**Temperature (K)**

**C1 Dust Enrichment Factor** (solar)
Plate 10. Calculated phase relations in systems enriched in a CI-chondrite-like dust at a total pressure (P\text{tot}) of 10^{-3} bar, calculated as in Ebel and Grossman (2000). See Table 1 for formulae and abbreviations. Circled numbers are assemblages: ① perovskite + Ca-monoaluminate + liquid, ② perovskite + Ca-monoaluminate, ③ melilite + Al-spinel + metal + Ca-pyroxene, ④ Al-spinel + metal + olivine + Ca-pyroxene, ⑤ Al-spinel + metal + olivine + Ca-pyroxene + feldspar, ⑥ liquid + olivine + metal + feldspar, ⑦ liquid + olivine + metal + orthopyroxene + feldspar + Ca-pyroxene, ⑧ liquid + olivine + metal + orthopyroxene + Cr-spinel + feldspar, ⑨ liquid + olivine + metal + Cr-spinel + MnO, ⑩ liquid + olivine + metal + Cr-spinel + feldspar + MnO, ⑪ = ⑫ + Ca-pyroxene, ⑬ = ⑭ + sulfide + MnTiO_3, ⑮ = ⑯ + whitlockite, ⑰ Ti_3O_5 is briefly stable in this field. Manganese is calculated to condense as MnO, as well as MnTiO_3 oxide, that would both dissolve in real coexisting silicates (e.g., olivine, pyroxene).

Accompanies chapter by Ebel (pp. 253–277).