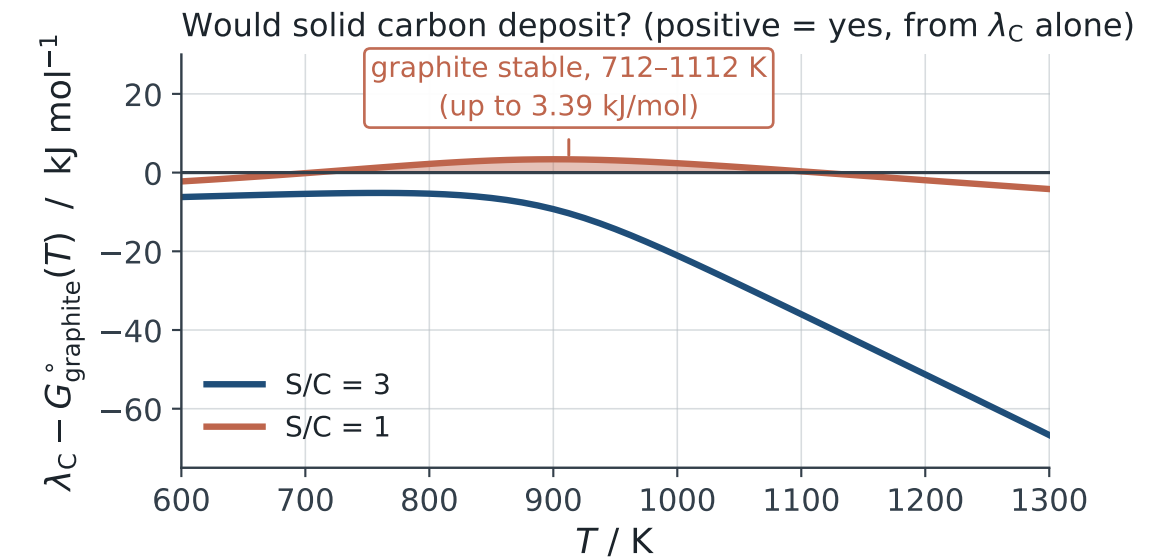
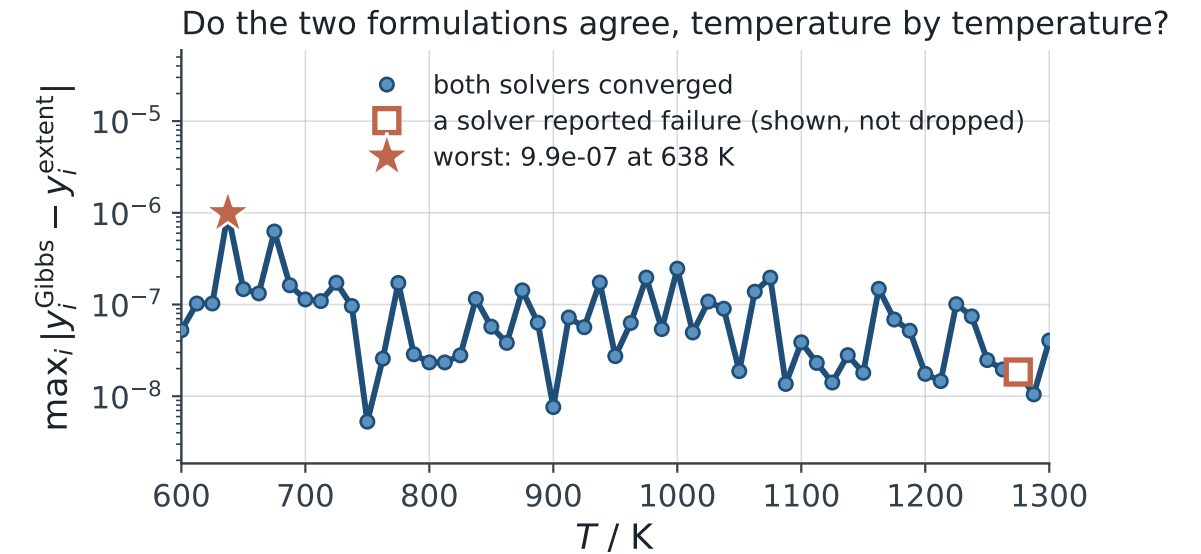
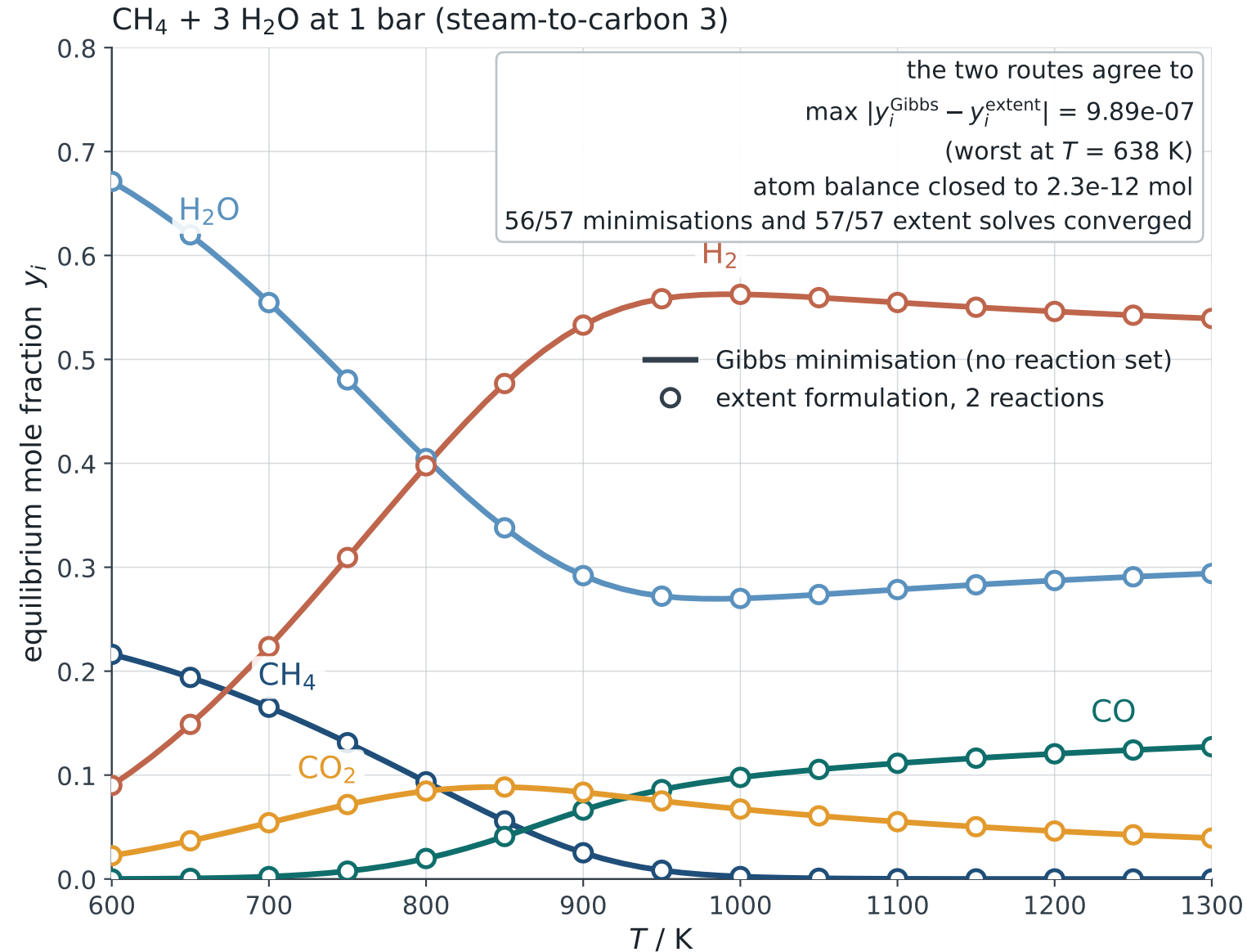


Two formulations of the same problem, five species and three elements, agreeing to 9.9×10^{-7} in mole fraction at every temperature



All formation properties from `chemicals`; graphite from `Hfs`/`S0s` for CAS 7782-42-5 with the JANAF solid C_p table. The check that graphite is right: $\text{C} + \text{CO}_2 \rightarrow 2 \text{CO}$ gives $\Delta H_{298}^\circ = 172.4$, $\Delta G_{298}^\circ = 120.0 \text{ kJ/mol}$ (literature 172.5, 120.0) and $\text{CH}_4 \rightarrow \text{C} + 2 \text{H}_2$ gives 74.5, 50.4 kJ/mol (literature 74.9, 50.8). The main panel is a single gas phase: at $S/C = 3$ graphite is never stable, so that is the true equilibrium; at $S/C = 1$ it is not, inside the shaded band.