The possibilities of a carbothermal process for aluminium has attracted interest in the system Al-O-C for more than fifty years, and it still does. It is generally recognized that a potential process would involve a molten phase in the system Al2O3-Al4C3. The phase diagram of this system will be reviewed, including some words on the gas pressures at equilibrium in the presence of solid carbon. Then a thermodynamic model of the system will be presented, considering the molten phase as a mixture of the three ionic species AlO+, AlO2- and AlC-.