

Material Compatibility – Sample in Crucible

Material Compatibility

The right crucible must always be chosen for the given experiment. Crucible materials should be specially selected depending on the application and sample materials in order to prevent reactions between the sample and crucible.

These tables serve to indicate which of the common crucible types can be used for each application, including ceramics, metals, inorganics and other more general applications.

General Applications

Materials/ Crucible Types	Pt/Rh	Al ₂ O ₃	Al	Pt+Al ₂ O ₃ liner	Al ₂ O ₃ crucible sprayed with Y ₂ O ₃	Graphite
Clays	✓	✓*	✓	✓*	✓*	No
Minerals	✓	✓*	✓	✓*	✓*	No
Oxide ceramics	✓	✓*	✓	✓*	✓*	No
Salts	✓	No	✓	No	No	No
Glasses	✓	No	✓	No	No	✓*
Metals	No**	✓	No	✓	✓	No
Polymers	✓	✓	✓	✓	✓	✓
Carbon materials	✓*	✓*	✓	✓*	✓*	✓
Inorganics	✓*	✓*	✓*	✓*	✓*	✓*

Ceramics

Materials/ Crucible Types	Pt/Rh	Al ₂ O ₃	Al	Pt+Al ₂ O ₃ liner	Al ₂ O ₃ crucible sprayed with Y ₂ O ₃	Graphite
Alumina (Al ₂ O ₃)	✓	✓	✓	✓	✓	✓*
Zirconia (ZrO ₂)	✓	✓	✓	✓	✓	✓*
Y ₂ O ₃ or MgO	✓	✓	✓	✓	✓	✓*
Silicon dioxide (SiO ₂)	✓	No	✓	No	No	No
Silicon nitride (Si ₃ N ₄)	No	✓*	✓	✓*	✓*	✓*
Aluminum nitride (AlN)	✓*	✓*	✓*	✓*	✓*	✓*
Boron nitride (BN)	✓*	✓*	✓*	✓*	✓*	✓*
Silicon carbide (SiC)	No	✓*		✓*	✓*	✓*
Titanium oxide (TiO ₂)	✓	✓	✓	✓	✓	✓*

Metals

Materials/ Crucible Types	Pt/Rh	Al ₂ O ₃	Al	Pt+Al ₂ O ₃ liner	Al ₂ O ₃ crucible sprayed with Y ₂ O ₃	Graphite
Al and Al-alloys	No**	✓	No	✓	✓	✓
Mg and Mg-alloys	No**	✓*	No	✓*	✓*	✓
Cu and Cu-alloys	No**	✓	No	✓	✓*	✓
Fe and Fe-alloys	No**	✓*	No	✓*	✓	No
Ni and Ni-alloys	No**	✓*	No	✓*	✓	No
Ti and Ti-alloys	No**	✓*	No	✓*	✓	No
Sn and Sn-alloys	No**	✓	No	✓	✓	✓
Au- and Ag-alloys	No**	✓	No	✓	✓	✓*
Cr-, Mo-, Co-alloys	No**	✓*	No	✓*	✓	No

Inorganics

Materials/ Crucible Types	Pt/Rh	Al ₂ O ₃	Al	Pt+Al ₂ O ₃ liner	Al ₂ O ₃ crucible sprayed with Y ₂ O ₃	Graphite
Silicon	No	No	✓	No	No	✓*
Iron oxide	✓	No	✓	No	No	No
Lead oxide	No	✓*	✓*	✓*	✓*	No
Magnesium fluoride	✓	No	✓	No	No	No information
Calcium fluoride	✓	No	✓	No	No	✓
Copper oxide	✓	No	✓	No	No	No
Graphites	✓*	✓*	✓*	✓*	✓*	✓
Carbonates	✓	✓*	✓	✓*	✓*	No
Sulphates	✓	✓*	✓	✓*	✓*	No

✓ No reaction expected

✓* Reactions possible at high temperatures

No** Not recommended; reactions may occur prior to or during melting.
This could lead to damage to the crucible and/or sensor.
Extreme caution advised.