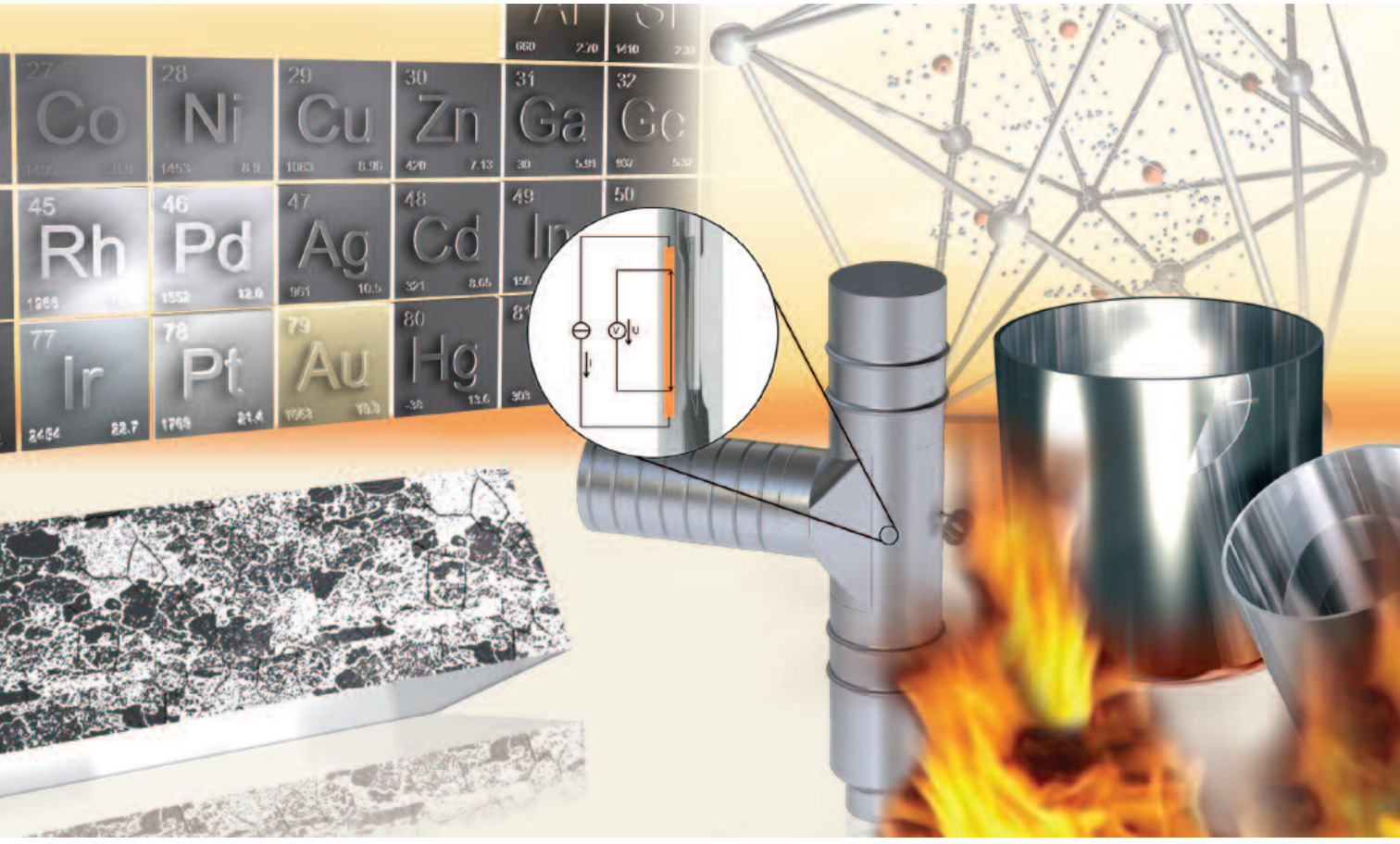
Heraeus



Physical Properties of Pt Materials and Pt DPH Materials

In addition to platinum and the conventional Pt-Rh alloys, there are the oxide dispersion hardened versions of these materials which can be used at even higher temperatures in a very wide variety of applications because of their higher levels of strength.

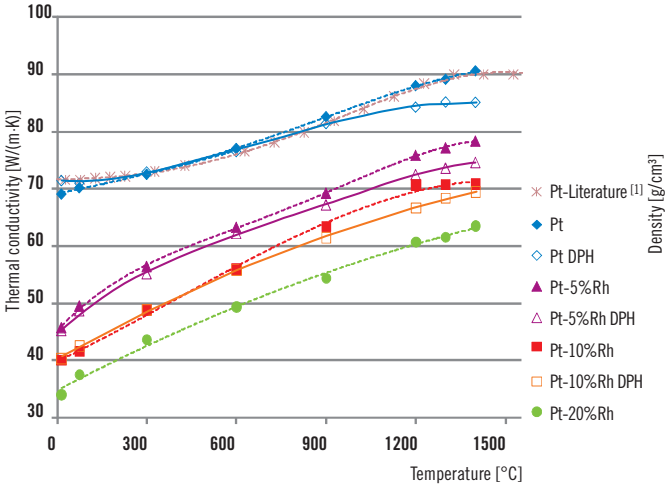
In these applications, it is very important to know the physical properties of each material, e.g. the thermal conductivity, density, thermal expansion characteristics and the electrical resistivity.

The thermal conductivity comprises the thermal diffusivity, density and specific heat of the material.

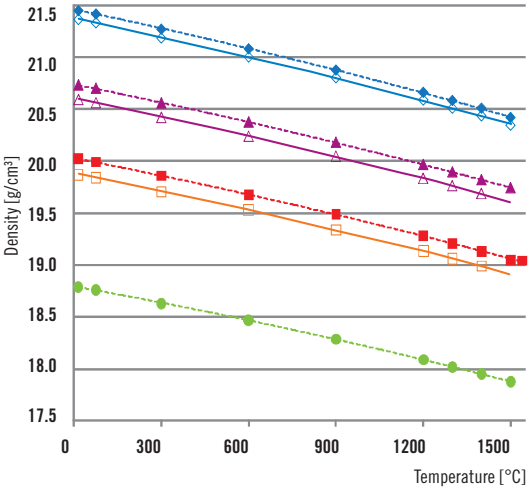
The thermal diffusivity is measured by the laser-flash method. The temperature dependence of density is characterized by determining the thermal expansion behavior with dilatometer measurements. The specific heat is determined by DSC (differential scanning calorimetry). The 4-point method is used to measure the electrical resistivity, in order to ensure that the results are not affected by the resistance of the leads. A constant current I is fed into the sample by means of two leads and the potential drop U is measured by two further leads positioned between the current leads. The resistivity is calculated from the sample geometry and the measured values of current and potential.

Physical Properties

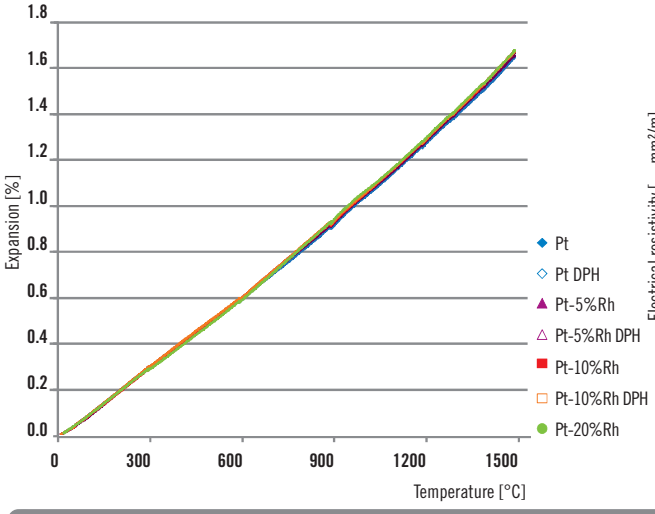
Thermal Conductivity



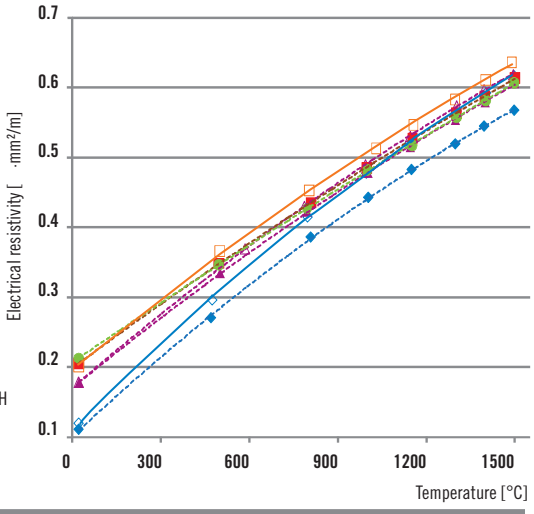
Density



Thermal Expansion Characteristics



Electrical Resistivity



Specific Heat [J/(K • g)]

	30°C	75°C	300°C	600°C	900°C	1200°C	1300°C	1400°C	1500°C
Pt[2]	–	0.13*	0.14*	0.15*	0.16*	0.17*	0.17*	0.17*	0,17*
Pt-10%Rh	0.14	0.14	0.14	0.14	0.15	0.16	0.17**	0.17**	0.18**
Pt-10%Rh DPH	0.15	0.15	0.14	0.15	0.15	0.16	0.17**	0.17**	0.18**

* interpolated from lit. [2]
** extrapolated from Heraeus measurements

[1] Platinum Metals Review, 1984, 28, (4), pp.165
[2] Edelmetalltaschenbuch, Giesel Verlag, 2001, p.109

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E 5C 10.2011/VN Rau Layout: 5TC, Friedberg