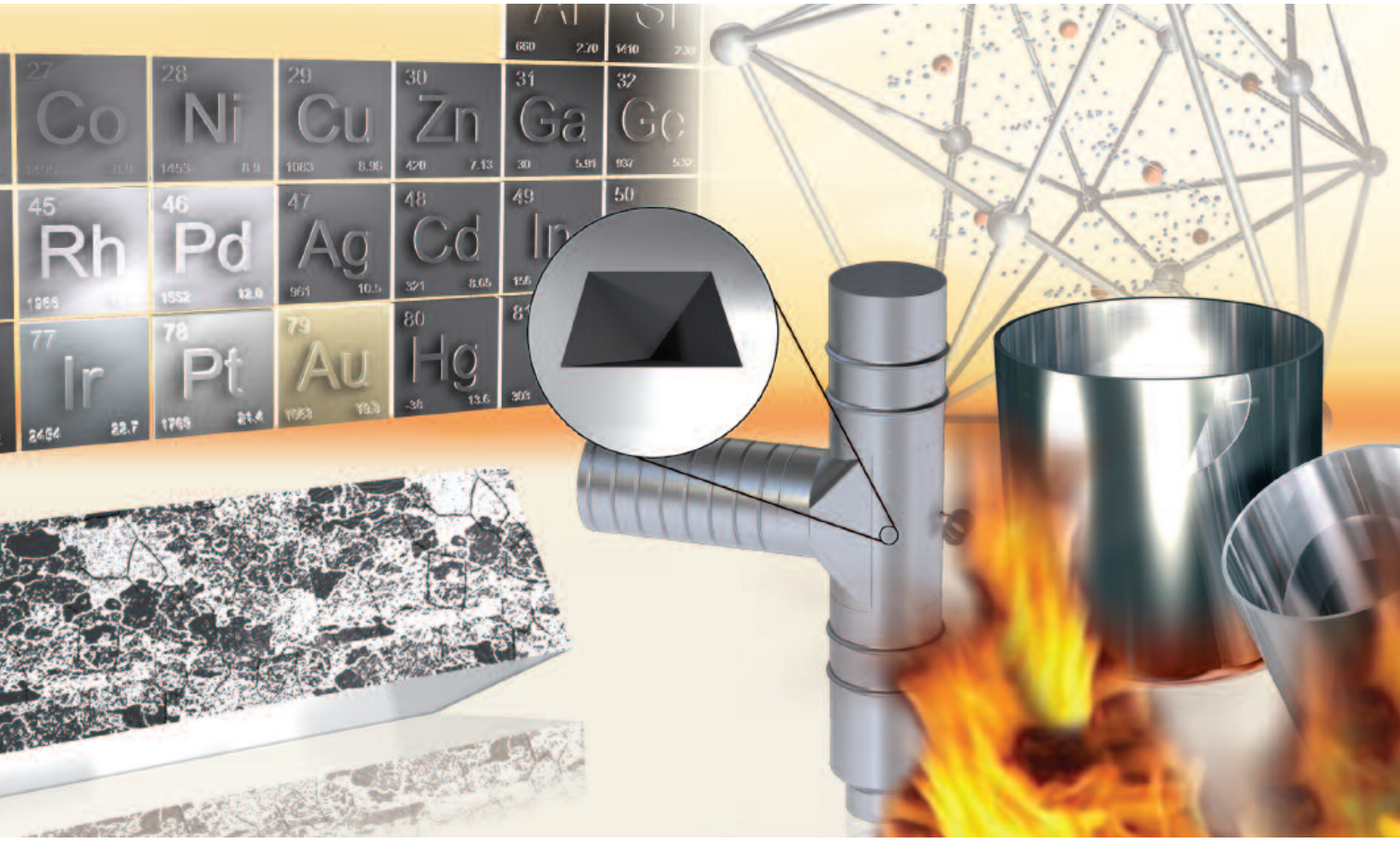
Heraeus



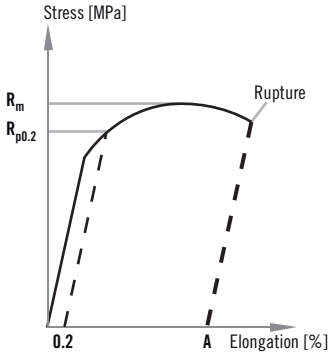
Mechanical Properties of Pt Materials and Pt DPH Materials

Platinum and Pt-Rh alloys are required for a large variety of applications. In addition to the conventional alloys, their oxide dispersion hardened versions are available which can be used at even higher temperatures because of their increased levels of strength.

For many applications it is very important to know the mechanical properties of the individual materials.

The hardness is determined according to the Vickers method at room temperature.

The mechanical properties tensile strength R_m, proof stress $R_{p0.2}$ and tensile elongation A are measured in tensile tests at the relevant temperature.



Mechanical Properties

In the Vickers hardness testing method, an equilateral diamond pyramid is pressed into the material with a specified load and the hardness value is determined from the dimensions of the hardness impression thus formed.

In the tensile test, a specimen of the material 0.8 mm thick and 4 mm wide is deformed at a constant rate and the required force is measured. The tensile strength describes the maximum force that is achieved and the proof stress describes the transition from elastic to plastic deformation. The tensile elongation is the length of the specimen after rupture relative to the original length.

	Pt	Pt DPH	Pt-5%Rh	Pt-5%Rh DPH	Pt-10%Rh	Pt-10%Rh DPH	Pt-20%Rh
Hardness HV1							
RT	42	60	73	82	94	113	99
Tensile Strength R_m [MPa]							
RT	128	178	231	290	301	371	377
1200°C	15.6	25.0	44.2	55.3	58.8	62.8	92.7
1400°C	8.2	15.6	25.3	31.2	35.4	36.6	51.4
1600°C	4.4	10.4	13.2	19.2	16.7	22.2	27.4
Proof Stress $Rp_{0.2}$ [MPa]							
RT	59	73	114	128	134	211	130
1200°C	7.6	18.5	27.1	40.0	44.3	51.3	58.6
1400°C	3.9	13.6	17.8	27.0	27.7	34.8	35.7
1600°C	3.0	9.8	10.1	16.1	14.7	22.0	24.4
Tensile Elongation A [%]							
RT	23	22	33	39	38	27	43
1200°C	64	68	57	59	42	34	29
1400°C	68	53	63	68	30	69	36
1600°C	64	45	55	71	54	66	34

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