

Dental Alloys

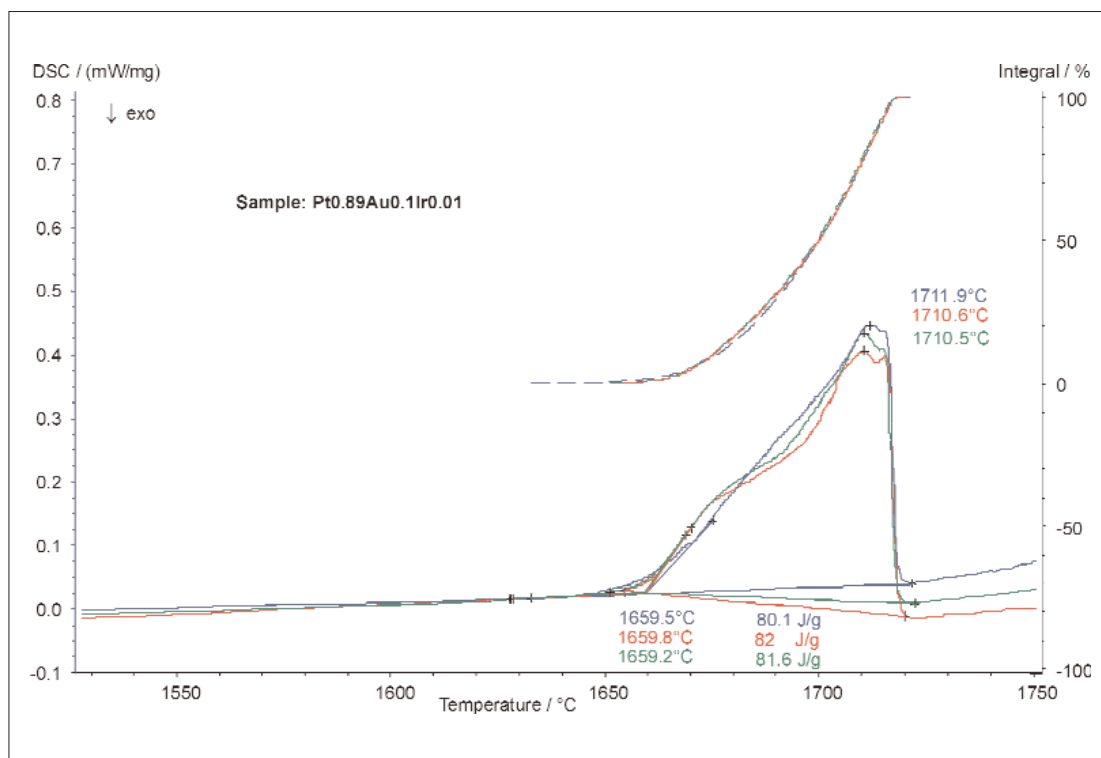
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It is very difficult to obtain a general impression of metal alloys used in dentistry because of the large number currently present on the market. Several hundred dental alloys are available only in the United States which have been registered by the American Dental Association. When two or three principal constituents of the alloys are known, it is possible to classify them into 4 groups: high-gold alloys, gold-reduced alloys, palladium-silver alloys and base metal alloys. The prerequisites of a dental alloy for dental applications are its bio-compatibility, malleability and resistance to corrosion. The requirement for a good bio-compatibility of a material is obviously closely related to the corrosion resistance. Thus, when the alloy is placed in contact with the body of the patient, there should be no detrimental harm to health. The aim is an alloy that is easy for the dentist to manipulate but is strong, stiff, durable and resistant to tarnish and corrosion. These alloys are used for inlays, crowns and bridges.

Test Conditions:

Temperature range: RT ... 1750°C
Heating/cooling rates: 10 K/min
Atmosphere: Argon at 60 ml/min

Sample mass: approx. 200 mg
Crucible: Al₂O₃
Sensor: TG-DSC type B



Results:

The heat-flow rate (DSC) of the dental alloy Pt_{0.89}Au_{0.1}Ir_{0.01} was measured to 1750°C (three samples were measured). At an extrapolated onset temperature of ~1659°C melting was observed. The melting peak occurred at ~1711°C. The melting enthalpy was ~81 J/g. From the DSC integral curves, the melting process can be seen. In general, a good reproducibility of the measurements could be demonstrated.