of the two platinum samples in an external field $B \leq 0.05$ mT. The results are shown in Figure 2. The two maxima at millikelvin temperatures are caused by the "spin glass freezing" of the magnetic 3*d* impurities in platinum at freezing temperature, T_f. At temperatures $T > T_f$ the AC susceptibility shows Curie behaviour with Curie constants $C_{11ppm} = 122$ μK and $C_{41ppm} = 448$ μK, determined at $1.6 \leq T \leq 40$ K in a commercial SQUID magnetometer.

We used this known behaviour (5) to scale our measured data in units of differential volume susceptibility. At $T < T_f$ the susceptibility decreases linearly with temperature and increases again at $T < 0.1$ mK. The latter increase is caused by the nuclear paramagnetic behaviour of the ^{195}Pt nuclei with a Curie constant of $C_{Pt} = 0.0185$ μK. No maximum in the susceptibility was found and therefore no evidence for nuclear ordering in our samples could be detected down to the minimum nuclear temperature reached of 0.3 μK.

Conclusions

The temperatures achieved in our platinum samples, for the conduction electrons and phonons, which are below 2 μK, are the lowest temperatures ever reached in equilibrium. No evidence of nuclear magnetic ordering in platinum could be detected. This shows that the temperatures achieved were still measured in the nuclear paramagnetic state where the Curie (or Curie-Weiss) law is valid, and therefore our determination of temperature, assessed via this law is correct.

This work should aid in extending understanding of the interplay between electronic and nuclear magnetism at very low temperatures.

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Palladium Colloid Catalyst Used in Microcontact Printing

There are several methods in current use for transferring very fine patterns onto substrates for printed electronic circuitry. These all involve the selective metallisation of the area to be treated and use various techniques, such as photolithography or electroless plating. However, scientists at Harvard University have now announced a new method of electroless deposition, which they have demonstrated with copper but suggest could also be used for the deposition of other metals (P. C. Hidber, W. Helbig, E. Kim and G. M. Whitesides, "Microcontact Printing of Palladium Colloids: Micron-Scale Patterning by Electroless Deposition of Copper", *Langmuir*, 1996, **12**, (5), 1375–1380).

Their new strategy involves the manual transfer of a palladium colloid catalyst onto a substrate surface by microcontact printing (μCP); this uses a patterned elastomer stamp made from poly(dimethylsiloxane). The stamp is previously dipped into the palladium colloid, which has been stabilised with tetraalkylammonium bromides. This is followed by the electroless deposition of copper which proceeds by immersion of the substrate in a copper plating bath, and occurs only at the regions coated with the palladium colloid, where a catalytic reaction occurs.

Copper lines of micron and submicron widths, having edge resolution of 100 nm, were produced on a variety of substrates, including glass, silicon with a silicon dioxide layer, and polymers. Both flat and curved surfaces can be plated without loss of resolution. In addition, free-standing, flexible structures can be produced by dissolving the substrate when the metal film reaches the required thickness or by allowing the internal stress in the electroless copper layer to exceed the adhesion strength, when delamination occurs.

While films of approximately uniform thickness can be produced by this method, ways of obtaining structures which have different layer thicknesses have also been developed.