Large, Nonsaturating Magnetoresistance in ScSb and Progress on the Development of a Pressure Cell for Pulsed Magnetic Field.

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Introduction

Non-magnetic extremely large magnetoresistance (XMR) is observed in a number of materials with diverse electronic and crystalline structures. Among XMR materials, rare-earth monopnictides *RX* (*R* = rare earth, *X* = Sb, Bi) with a simple rock-salt structure have drawn attention for exhibiting large nonsaturating magnetoresistance (MR), a resistivity plateau at low temperature and high field, and a field-induced upturn in resistivity [1-3]. We have previously reported a large nonsaturating MR in ScSb of 28 000% at T = 2 K and B = 14 T [1]. Here, we are interested in exploring the MR behavior at very high applied fields.

Experimental

The experiment was carried out at the NHMFL Pulsed Field Facility with a 65 T magnet. Electrical resistivity was measured using a standard four-terminal configuration with current flow in the *ab* plane and magnetic field perpendicular to current direction.

Results and Discussion

We observed large, non-saturating MR of ~271 000% at 1.24 K and 60 T (Fig. 1). The Shubnikov–de Haas (SdH) oscillation frequencies extracted from the MR data agree well with our previous study at B > 14 T [1] (Fig. 2). However, a new SdH peak was observed near 3 kT (labeled by * in Fig. 2).

In addition to our work in ScSb, we had made significant progress on the setup process of a new non-metallic miniature diamond anvil pressure cell designed by Dr. Sun and Dr. Balakirev. This progress will be useful for future electrical transport measurements at the Pulsed Field Facility.

Conclusions

We have studied the MR of ScSb. The MR is nearly quadratic in field and nonsaturating at 60 T. Shubnikov–de Haas oscillations with a rich frequency spectrum are clearly visible at different temperatures.

Acknowledgments

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References

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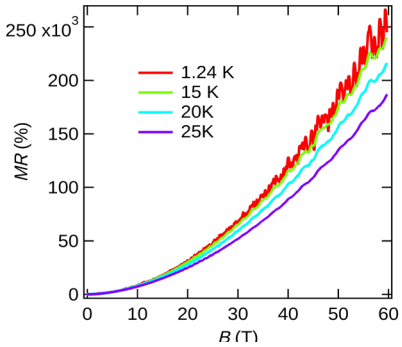

Fig.1 Magnetoresistance with the field applied along the *c* axis at different temperatures.

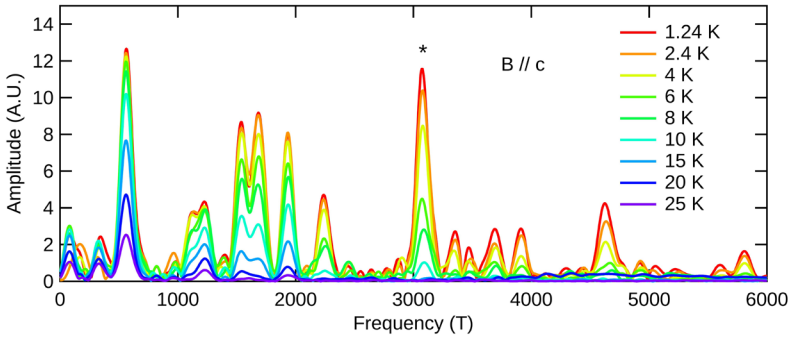

Fig.2 FFT spectra of SdH quantum oscillations at different temperatures with *B // c*.