

Magnetic phase transitions in TmNi₄Al studied by magnetometry and neutron diffraction

T. Toliński^a, A. Hoser^b, B. Andrzejewski^a and A. Kowalczyk^a

^aInstitute of Molecular Physics, PAS, Smoluchowskiego 17, 60-179 Poznań, Poland

^bInstitut für Kristallographie, RWTH-Aachen, Germany

Tm and its alloys are known to create the numerous non-collinear magnetic phases, therefore this same can be expected in the case of TmNi₄Al. Indeed, we have observed that this compound, contrary to the other RNi₄Al members, exhibits a double phase transition in the ac magnetic susceptibility with $T_{C1} = 5.8$ K and $T_{C2} = 2.8$ K. We have performed the magnetization curve measurements and the neutron diffraction experiments above the higher temperature transition, between the two transitions and below the lower temperature peak of the ac susceptibility. However, magnetization curves as well as the neutron diffraction patterns do not provide any evidence of the antiferromagnetic ordering. There is only an increase of the intensities observed between 4.2 K and 1.8 K. Therefore, the two peaks in the ac magnetic susceptibility have been ascribed to a switch between two various slightly non-collinear orders of the magnetic moments.

9.7 cm

13.4 cm

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Corresponding author :

T. Toliński

Address for correspondence :

Institute of Molecular Physics
Polish Academy of Sciences
Smoluchowskiego 17
60-179 Poznań
Poland

Email address :

tomtol@ifmpan.poznan.pl