

In this work the experimental peak widths  $\Delta(B^{-1})$  are determined on a reciprocal magnetic field scale. Therefore  $\Delta_S(B^{-1})$  has to be subtracted from  $\Delta(B^{-1})$ . Applying an extrapolation for  $\Delta_S(B^{-1})$  from the peaks where the spin splitting is visible, to get the true widths, yields values for the spin degenerate peaks in close agreement with scaling theory ( $\kappa \approx 0.4$ ).

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[1] S.W.Hwang et al., Phys. Rev. B **48** (1993) 11416.

[2] D.K.K.Lee and J.T.Chalker, Phys.Rev.Lett. **72** (1994) 1510.

### **P-FKP17 : The Effect of Pre-Deformation on the Ductility of Chromium**

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Due to their low neutron-induced radioactivity chromium based materials are considered to be candidates as structure materials in fusion technology. Drawbacks for the application of these materials in industrial design are their brittleness at room temperature and their high Ductile to Brittle Transition Temperatures (DBTT).

In this paper mechanical and fractographical investigations are presented of pure chromium (DUCROPUR) with a purity of about 99.97% and the dispersion strengthened chromium alloy Cr<sub>5</sub>Fe<sub>1</sub>Y<sub>2</sub>O<sub>3</sub> (DUCROLLOY). The investigated specimens have been produced in a powder metallurgical route. They have been tested in the as HIPped condition (recrystallized) and after different pre-deformations.

DUCROPUR and DUCROLLOY with as HIPped microstructures show in bending tests and tension tests brittle behaviour at RT. Plastic deformations are obtained between 200°C and 250°C and above 400°C, respectively. The K<sub>Q</sub> value of DUCROPUR increases from 12 MPam<sup>1/2</sup> at 290°C up to a value of 500 MPam<sup>1/2</sup> at 320°C. In spite of the large fracture toughness value at 320°C the final fracture occurs again in a cleavage mode. DUCROLLOY shows up to 740°C only a slight increase of fracture toughness with increasing temperature. An improvement in ductility and an significant increase in fracture strength have been induced by pre-deformation in tension, in bending, by Equal Channel Angular Extrusion (ECAE) and by Cyclic Channel Die Compression (CCDC).

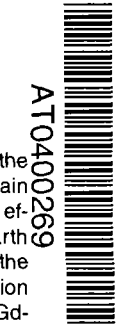
The developed microstructures of the samples have been investigated in the Scanning Electron Microscope (SEM) by means of different techniques. In order to determine the typical microstructure sizes Back Scattered Electrons (BSE) imaging has been applied. To differ if the boundaries are large or low angle boundaries the degree of misorientation has been determined with the Electron Back Scatter Diffraction (EBSD) method.

### **P-FKP18 : Spontaneous Magnetoelastic Effects in Gadolinium Compounds**

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This poster is a short summary of a recently published handbook chapter [1], where the spontaneous magnetoelastic effects in Gd compounds are reviewed showing that the strain dependence of the magnetic exchange interactions leads to significant effects. These effects are equal in magnitude to well established single ion contributions in other rare earth compounds with non vanishing orbital momentum (coming from the strain dependence of the crystal field). In some cases the exchange contribution can produce giant magnetostriction (GMS) or induce structural phase transitions. In order to extract the influence of the Gd-Gd exchange interactions, we consider only Gd compounds with partner elements showing



no or only weak induced magnetic moments. The current status of the theory is presented and compared to measurements performed by temperature dependent x-ray diffraction and results of dilatometric measurements.

### **P-FKP19 : Hyperfeinwechselwirkungen in substituierten Ferriten - eine Hilfe beim Studium magnetischer Eigenschaften**

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Ferrite basierend auf der Zusammensetzung Sr(Ba)Fe<sub>12</sub>O<sub>19</sub> sind ein breit angewandtes Permanentmagnetmaterial. In letzter Zeit fand man, daß eine gezielte Substitution (gleichzeitiges Ersetzen von Sr(Ba) durch La und Fe durch Co) die magnetischen Eigenschaften weiter verbessern kann. Bei der Suche nach der Ursache dafür stellen Hyperfein-Techniken, die einen Atomkern als lokale Meßsonde verwenden, eine wertvolle Hilfe dar. Im speziellen werden <sup>57</sup>Fe Mössbauer-Messungen und <sup>57</sup>Fe sowie <sup>59</sup>Co NMR-Studien präsentiert.

### **P-FKP20 : Diffusion mechanism of iron in ternary (Ni,Fe)-Al alloys with B2-structure**

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Intermetallic phases have been in center of interest for high-temperature-materials for a few decades. Compared to conventional materials they show clearly better behavior in the high temperature range especially in creep-resistance and ductility. These values are better for ternary (Ni,Fe)-Al alloys, than for binary Ni-Al or Fe-Al alloys. We have studied the atomistic diffusion mechanism of iron atoms in Ni<sub>40</sub>Fe<sub>10</sub>Al<sub>50</sub> and Ni<sub>45</sub>Fe<sub>5</sub>Al<sub>50</sub> with Quasielastic-Moessbauer-Spectroscopy (QMS). We determined jump frequencies and directions of the diffusing iron atoms as well as the diffusion coefficient and activation energy. The gained data was compared with tracer-measurements of the binary Ni-Al compound. While molecular-dynamical calculus leads to direct next-nearest-neighbour (NNN) jumps of Ni-atoms in NiAl our measurements show a clear nearest-neighbour (NN) jump of Fe in NiFeAl for both alloys studied with an activation energy of 4 eV for the single atomic jump. These results are in good agreement with the tracer data for NiAl alloys.

### **P-FKP21 : Dynamischen Rekristallisation für den Modellwerkstoff NIMONIC 80A anhand eines statistischen Modells**

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Bei der Warmverformung des betrachteten Modellwerkstoffs NIMONIC 80A kommt es durch Erhöhung der Versetzungsdichte und somit der inneren Energie aufgrund des Strebens nach Energieminimierung zur dynamischen Rekristallisation. Um diesen Vorgang mittels eines Modells zu beschreiben werden bestimmte Modellannahmen getroffen. Mittels Keimbildungskriterium, Keimbildungsfunktion, Annahme über die Wanderungsgeschwindigkeit der Korngrenzen und der Entwicklung der Versetzungsdichte im Werkstoff, lässt sich ein rekristallisierter Anteil und somit auch die Fließspannung des Materials bestimmen. Andererseits sind zur Überprüfung der in das Modell gesteckten Annahmen qualifizierte Expe-