Downloads and the impact of Open Access at IJMR

Twice-yearly editorials in previous volumes of IJMR used to look at the Top Ten Downloads of papers from ijmr.de. As the journal website evolved, this information has now moved online in a much more regularly updated form (http://www.hanser-elibrary.com/loi/ijmr). Since then there has been further evolution in the way the journal is published, with Open Access being an option available to authors allowing their papers to be accessed by anyone free of charge, rather than just by journal subscribers. Open access to scientific publications is becoming increasingly widespread, with some research funding agencies insisting on work they fund being published that way. Alongside author-initiated (i. e. author-paid) open access, every month the editor of IJMR selects one paper from each issue to be made open access (for free) immediately as a means of showing the benefits to be gained. Here we take a look at how open access has influenced downloads of IJMR papers.

The Top 20 downloads are shown on our website (for address, see above) and even a cursory glance reveals the contrast between open access and subscriber-only papers. The top ten are all open access, with between 106 and 506 downloads over the past 12 months. Places 11 to 20 are all subscriber-only with between 24 and 37 downloads over the same period.

What topics are open access papers examining? In first place with 506 downloads is "Microstructural development and crystallographic properties of decomposing Fe–N–C compound layers" by Göhring et al. After the end of the nitrocarburising treatment, slow cooling or secondary annealing, instead of quenching, causes decomposition of layer phases. These decomposition microstructures were analysed and then compared with data for undecomposed structures from quenched specimens. In this way information lacking in the Fe–N–C phase diagram was obtained. In second place, with 398 downloads, Woehrle et al. "Fe–N and Fe–N–C phase equilibria above 853 K studied by nitriding/nitrocarburising and secondary annealing" describe obtaining new information on the metastable Fe–N and Fe–N–C systems above 853 K at 1 atm. The determined temperatures for the invariant eutectoid and transition reactions as well as the extent of the ternary ϵ-phase field were compared with phase diagrams calculated on the basis of different thermodynamic descriptions of the Fe–N–C system.

The next six papers are separated by only 31 downloads. "In-situ annealing and computation study of cube texture development in a commercial aluminum alloy" by Sukhopar and Gottstein (192 downloads) describes identifying the physical processes of nucleation and growth of cube grains. Accounting for growth competition at an early stage of recrystallization, rather than just the calculated nuclea-tion site density at cube bands, was needed for a better agreement between model and experiment. In fourth place, with 186 downloads, Tang and Guo propose a single-crystal partition model to simulate the weakening effects of grain defects in "Effect of grain defects on the mechanical behavior of nickel-based single crystal superalloy". ABAQUS is used to show that yield strength and elastic modulus of misoriented grains, which are determined by the crystallographic orientation, have a significant effect on the stress distribution of the bicrystal model. With 178 downloads, Aranas Jr. et al. are in fifth. Their paper "A metastable phase diagram for the dynamic transformation of austenite at temperatures above the Ae_3" proposes a method for calculation of the pseudobinary phase diagram associated with the dynamic transformation of austenite to ferrite. A metastable phase diagram is calculated for a 0.30 wt.% Mn-0.01 wt.% Si steel by balancing the driving force against the three obstacles. The results show that, under dynamic conditions, the ferrite phase field extends all the way from room temperature to that for the formation of delta ferrite.

Severe plastic deformation to produce ultra-fine grained structures has been a popular subject area in IJMR and is represented here by Kotzurek et al. "Structural anisotropy in equal-channel angular extruded nickel revealed by dilatometric study of excess volume" in sixth with 173 downloads. The authors study structural anisotropy and excess volume in ultra-fine grained high-purity nickel prepared by equal-channel angular pressing (ECAP). Taking into account shape anisotropy of the crystallites, the length change in various directions can be quantitatively analysed yielding direct access to the concentration of deformation-induced lattice vacancies, the vacancy relaxation, and the grain boundary expansion. In "Study of plastic deformation mechanisms in TA15 titanium alloy by combination of geometrically necessary and statistically-stored dislocations" (170 downloads), He et al. identified and studied slip lines and dislocations from tensile tests using SEM and TEM. The <a>-type slip is the dominant deformation mechanism at the early stage of plastic deformation, whereas <c+a>-slips become dominant with further increase in deformation strain. In eighth place are Márquez-Herrera et al. with "Boride coating on the surface of WC–Co-based cemented carbide" (161 downloads). Structural properties and enhancement in the hardness of commercial WC–Co-based cemented carbide inserts after boronising are shown enhance cutting tool performance.

In ninth, with 121 downloads, is "Nanocomposite based on polyaniline emeraldine-base and α-Al$_2$O$_3$: A structural characterization". Sanches et al. investigate a ceramic-matrix nanocomposite based on polyaniline emeraldine base and aluminium oxide. They showed that the polymeric rein-

forcement and the ceramic matrix maintained their original structural features, but the electrical conductivity in the nanocomposite was reduced by a factor of 80 when compared with that of the pure base.

The last open access paper in the list, with 106 downloads, is Madej et al. "Digital material representation concept applied to investigation of local inhomogeneities during manufacturing of magnesium components for automotive applications". The authors aim at multi-scale CAD of manufacturing processes by using macro- and micro-scale phenomena in FEM and a cellular automata based algorithm. Application to an AZ31 component is demonstrated.

As the download list is constantly updated, this is simply a snapshot taken at the end of March 2017. However, it is abundantly clear that open access generates much greater visibility for authors' work. It speaks volumes that the lowest ranked open access paper has generated nearly three times the number of downloads compared to the highest ranked subscriber-only paper. There are many facets to this and scientific publishing is evolving rapidly.

We expect that open access will continue to increase the exposure of work published in IJMR to a wider audience. Further, we hope that open access will have a knock-on effect of increased interest in IJMR papers currently not open access and, of course, that authors will increasingly consider opting for open access when they submit papers.

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