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Patterns of Grain Fragmentation During Plastic Deformation of Metals at Small to Medium Strains (Brief Review)

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Abstract. The review is devoted to the phenomenon of fragmentation: the subdivision of initial grains into highly misoriented crystallites in the process of plastic deformation. The investigations performed mostly during last two decades were considered and, in doing so, the early stages of fragmented microstructure evolution were of interest. Characteristics of regular cell block structure, described repeatedly before, were specified on the basis of more recent investigations, in particular, its orientation dependence and the development of primary and secondary microbands. The large-scale manifestations of grain subdivision, zones of intense fragmentation as well as the evolution of misorientation angle distribution with increasing strain and changing deformation conditions were also considered. Finally, the modeling of fragmentation is discussed briefly.

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