

## Model of Ductile Fracture Initiation in Metal/Graphene Composites

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**Abstract.** We suggest a model that describes the initiation of ductile fracture in metal/graphene composites. Within the model, the cracks are generated at dislocation pileups formed at the metal/graphene interfaces in the course of plastic deformation of composites. The transformation of these cracks to elongated voids and their coalescence leads to ductile failure of metal/graphene composites. For an exemplary case of Al-4Cu/graphene composites we have calculated the critical strain for the ductile fracture initiation as a function of the structural parameters of graphene platelets. Assuming that strain to failure is mainly determined by the strain for fracture initiation, we have calculated the strain to failure of metal/graphene composites. It appeared that strain to failure is maximum in the case of short graphene platelets. The calculated values of strain to failure agree with the experimental data for Al-4Cu/graphene composites.

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