

Abstract Submitted  
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**Phenomenological Mechanochemical of Damage and Radial Cracking in Brittle Substances** MICHAEL GRINFELD, U.S. Army Research Laboratory — Basic principles of Phenomenological Mechanochemistry of Damage (PMD) have been formulated in Grinfeld and Wright (2002, 2004.) To some extent, it is a natural extension of the traditional damage theory, presented by Kachanov (1976.) Contrary to Kachanov's approach, the PMD theory includes, in addition to the bulk elastic energy, the energy associated with braking/recovery of chemical bonds. Therefore, in addition to the elasticity equations it includes the equation, describing evolution/dynamics of chemical bonds. Although "chemical bonds" is a nano-scale concept, we treat the bonds using phenomenological approach. The additional equation of damage evolution is of the rate type, thus, making the whole model rate-dependent (even in quasi-static approach.) In the paper, we review some earlier results and present the novel ones with emphasis on the rate-dependent effects.

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- [2] Grinfeld, MA, Wright, TW. Morphology of fractured domains in brittle fracture. Metallurgical and Materials Transactions A. 2004;35A:26512661.
- [3] Kachanov, LM. Introduction to continuum damage mechanics. Dordrecht: (Netherlands): Martinus Nijhoff Publishers;1986

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