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Dissolution of a multicomponent droplet in an immiscible ambient fluid: Application of the distribution law[1] SHIGAN CHU, ANDREA PROSPERETTI[2], Johns Hopkins University, ANDREA PROSPERETTI COLLABORATION — A liquid droplet will shrink in an undersaturated ambient liquid medium due to mass transfer across the interface even when the drop liquid is only sparingly soluble in the host liquid. The dissolution rate of a single-component droplet can be accurately predicted by an adaptation of the the Epstein-Plesset theory, in which it is assumed that the droplet surface remains at saturation. This hypothesis may be violated in the case of a multi-component droplet, as the more soluble component dissolves faster than the other(s). As a consequence, the droplet surface cannot remain saturated with this component in the later stages of the process. To account for this feature a modified Epstein-Plesset theory is developed on the basis of the distribution law of liquid-liquid solutions. The implications of the teory are illustrated with several examples.

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