Interfacial energy and spatial distribution of crystals in rocks

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Grain transition probability studies show that spatial distributions of crystals are not random in most rocks. Nonrandomness lead to preferred crystal association giving rise to higher frequency of like- or unlike-crystal contacts than the expected values. Interfacial energy may be a controlling factor for such preferred crystal association.

Energies associated with the different types of crystal contacts are different, consequently the crystals would be distributed in a pattern that minimizes the high energy contacts in order to minimize the total free energy of the rock. A segregation pattern would tend to develop if the average energy of the like crystal contacts are less than that of the unlike crystal contacts, while an ordered pattern would form for the opposite condition. A preferred association, however, reduces the entropy of the system, thereby raising the free energy. A stable distribution pattern thus probably reflects the net effects of interfacial energy and the configurational entropy.

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