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## **EFFECTIVE DIFFUSION COEFFICIENT AND EFFECTIVE MEDIA THEORY FOR RANDOM WALKING ON 2D LATTICE WITH INCLUSIONS**

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Discrete two-dimensional periodic system of squares with impenetrable inclusions is considered. Non monotonous effective diffusion coefficient  $D_{eff}$  dependence on inclusions' volume fraction  $f$  is analyzed. It is shown that modified Maxwell-Garnett equation [1] for  $D_{eff}$  applicability extends to inclusions' volume fraction close to 1. Theoretic estimation of  $D_{eff}$  for  $f$  values in the limit  $f=1$  are given. Results are confirmed by computer simulation for growing period  $L$  values (measured in elementary hopping lengths). Function  $D_{eff}(L)$  is analyzed and essential differences from diffusion theory results are stressed.

### **References**

1. J. R. Kalnin, E.A. Kotomin and J. Maier. Calculations of the effective diffusion coefficient for inhomogeneous media. *Journal of Physics and Chemistry of Solids* 63. 2002. 449±456.