Numerical Computations of Conductivities over Agglomerated Continuum Percolation Models

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(Submitted on 11 Jul 2011 (v1), last revised 5 Jul 2012 (this version, v3))

In order to clarify how the percolation theory governs the conductivities in real materials which consist of small conductive particles, e.g., nanoparticles, with random configurations in an insulator, we numerically investigate the conductivities of continuum percolation models consisting of overlapped particles using the finite difference method as a sequel of our previous article (Int. J. Mod. Phys. 21 (2010), 709). As the previous article showed the shape effect of each particle by handling different aspect ratios of spheroids, in this article we numerically show influences of the agglomeration of the particles on conductivities after we model the agglomerated configuration by employing a simple numerical algorithm which simulate an agglomerated configuration of particles by a natural parameter. We conclude that the dominant agglomeration effect on the conductivities can be interpreted as the size effect of an analyzed region. We also discuss an effect of shape of the agglomerated clusters on its universal property.

Comments:	30 pages, 15 figures
Subjects:	**Materials Science (cond-mat.mtrl-sci)**; Statistical Mechanics (cond-mat.stat-mech); Computational Physics (physics.comp-ph)
Cite as:	**arXiv:1107.2158 [cond-mat.mtrl-sci]**
	(or **arXiv:1107.2158v3 [cond-mat.mtrl-sci]** for this version)

Submission history

From: Shigeki Matsutani [view email]
[v1] Mon, 11 Jul 2011 22:10:48 GMT (1296kb)
[v2] Thu, 15 Mar 2012 05:27:40 GMT (1142kb)
[v3] Thu, 5 Jul 2012 00:33:51 GMT (1817kb)

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