

Erratum

Light scattering calculations of multi-sphere polycrystalline graphite clusters

A comparison with the 2200 Å peak and between a rigorous solution and discrete-dipole approximations

Anja C. Andersen^{1,2}, Juan A. Sotelo^{3,5}, Vitaly N. Pustovit^{4,5}, and Gunnar A. Niklasson⁵

¹ NORDITA, Blegdamsvej 17, DK-2100 Copenhagen, Denmark

² Department of Astronomy & Space Physics, Uppsala University, P.O.Box 515, SE-751 20 Uppsala, Sweden

³ Dpto. de Física, Informática y Matemáticas, Universidad Peruana Cayetano Heredia, Aptdo. 4314, Lima, Peru

⁴ Department of Radiology, Washington University, 4525 Scott. Ave. - East Building, St. Louis, MO 63110, USA

⁵ Department of Materials Science, Uppsala University, P.O.Box 534, SE-751 21 Uppsala, Sweden

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Abstract.

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Due to a publishing error Fig. 5 of our paper (Andersen et al. 2002) was shown twice, so that Fig. 6 was missing. The missing figure is reproduced as Fig. 1 of this Erratum.

In addition an incorrect value of the real dielectric function of graphite was used in our computations, since we overlooked that the tabulation of Draine (2002) gives $\text{Re}(\epsilon_p - 1)$ and not $\text{Re}(\epsilon_p)$. This oversight has negligible influence on the computed extinction in the infrared and most of the visible spectral region. However the extinction peak around 2200 Å is shifted $\approx 0.15 \mu\text{m}^{-1}$ toward longer wavelengths and diminished somewhat in intensity, when the correct input data were used. The corrected peak positions and widths are given in Table 1 below, which replaces Table 2 in the original paper. It is seen that our results are now in better agreement with those of Rouleau et al. (1997). The corrected rigorous solution (Gérardy & Ausloos 1982; GA) and the two different discrete-dipole approximation methods – DDSCAT (Draine & Flatau 1994) and MarCoDES (Markel 1998) – are shown in Fig. 1 together with the initial GA computations as an illustration of the difference. The main conclusions in our paper are not affected by these differences.

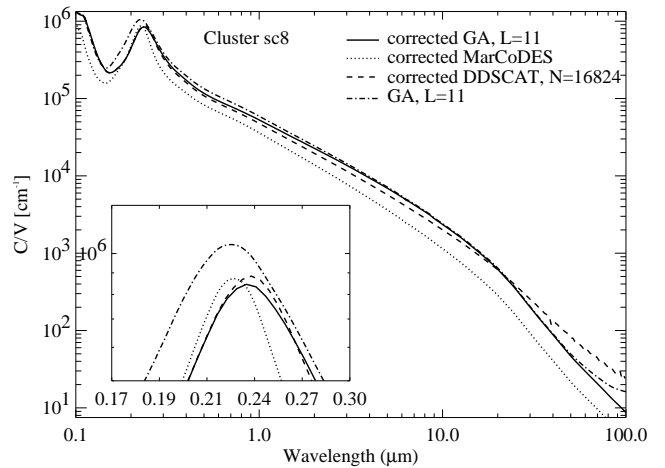


Fig. 1. A comparison of the solutions from the GA, MarCoDES and DDSCAT calculations for the extinction cross section of the simple cubic cluster containing 8 polycrystalline graphitic particles. The GA solution is within 1% of the exact solution at $L = 11$ for the shown wavelength range. In the DDSCAT calculation 16 824 dipoles were used. The particle radius was 10 nm. Also shown is the original GA calculation.

References

Andersen A.C., Sotelo J.A., Niklasson G.A., Pustovit V.N., A&A, 386, 296

Table 1. Peak position and full width at half maximum (FWHM) of different clusters, as calculated with the GA method. The value of L indicates at which polar order the GA calculations were truncated.

cluster name	L	peak [μm^{-1}]	FWHM [μm^{-1}]
frac7	11	4.36	1.04
frac49	6	4.36	1.15
frac343	2	4.26	1.01
sphere	3	4.46	0.97
fcc4	11	4.27	0.99
fcc32	7	3.90	1.09
fcc 49	6	3.63	1.31
fcc108	3	3.82	1.58
sc8	11	4.25	1.41
sc27	7	3.96	1.27

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