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# Erratum

Wang, Z. L. (1996) Valence Electron Excitations and Plasmon Oscillations in Thin Films, Surfaces, Interfaces and Small Particles. *Micron* **27** (3–4), 265–299.

Equation (2.20a) in the review article of Wang (1996) contains some typos, the correct form of which should be

$$\Delta E=\frac{e}{2\pi}\int_{-\infty}^{\infty}\mathrm{d}z\int_{-\infty}^{\infty}\mathrm{d}\omega\,\exp(-i\omega z/v)\left\{\frac{\partial}{\partial z}\left[\int_{-\infty}^{\infty}\mathrm{d}t'\,\exp(i\omega t')\tilde{V}_i(\mathbf{r},\mathbf{r}_0(t'))\right]\right\}\Bigg|_{\mathbf{r}=\mathbf{r}_0}$$

$$=\frac{e}{2\pi v}\int_{-\infty}^{\infty}\mathrm{d}\omega\int_{-\infty}^{\infty}\mathrm{d}z\,\exp(-i\omega z/v)\int_{-\infty}^{\infty}\mathrm{d}z'\,\exp(i\omega z'/v)\left[\frac{\partial}{\partial z}\tilde{V}_i(\mathbf{r},\mathbf{r}_0)\right]\Bigg|_{\mathbf{b}=\mathbf{b}_0}$$

$$=\frac{ie}{2\pi v^2}\int_{-\infty}^{\infty}\mathrm{d}\omega\int_{-\infty}^{\infty}\mathrm{d}z'\,\exp(i\omega z'/v)\int_{-\infty}^{\infty}\mathrm{d}z\,\omega\,\exp(-i\omega z/v)[\tilde{V}_i(\mathbf{r},\mathbf{r}_0)|_{\mathbf{b}=\mathbf{b}_0}]$$

$$=\frac{e}{\pi v^2}\int_{0}^{\infty}\mathrm{d}\omega\int_{-\infty}^{\infty}\mathrm{d}z'\int_{-\infty}^{\infty}\mathrm{d}z\,\omega\,\mathrm{Im}\{-\exp[i\omega(z'-z)/v]\,[\tilde{V}_i(\mathbf{r},\mathbf{r}_0)|_{\mathbf{b}=\mathbf{b}_0}]\},\qquad(2.20a)$$

where $\mathbf{b}=(x,y)$, $\mathbf{b}_0=(x_0,0)$ specifies the impact vector of the incident electron, and $\tilde{V}_i(\mathbf{r},\mathbf{r}_0)$ is the electrostatic potential due to the induced charges when a 'stationary' electron is located at $\mathbf{r}_0=(x_0,0,z')$, i.e., it is the homogeneous component of $\tilde{V}$ governed by the Poisson equation

$$\nabla^2\tilde{V}(\mathbf{r},\mathbf{r}_0)=\frac{e}{\varepsilon(\omega)\varepsilon_0}\delta(\mathbf{r}-\mathbf{r}_0).$$

*This is a time independent equation* since the $z$-axis position of the point electron is specified by $z'$ rather than $vt$. Accordingly, eqn. (2.21) should be

$$\frac{\mathrm{d}P(\omega)}{\mathrm{d}\omega}=\frac{e}{\pi\hbar v^2}\int_{-\infty}^{\infty}\mathrm{d}z'\int_{-\infty}^{\infty}\mathrm{d}z\,\mathrm{Im}\{-\exp[i\omega(z'-z)/v][\tilde{V}_i(\mathbf{r},\mathbf{r}_0)|_{\mathbf{b}=\mathbf{b}_0}]\}\qquad(2.21)$$

where $\tilde{V}_i(\mathbf{r},\mathbf{r}_0)|_{\mathbf{b}=\mathbf{b}_0}=\tilde{V}_i(\mathbf{b}=\mathbf{b}_0,z,\mathbf{b}_0,z')$. *It is important to emphasize that this equation can only be applied to calculate the energy-loss spectra of surface excitations* in a finite system because no singularity of $\tilde{V}_i(\mathbf{r},\mathbf{r}_0)$ and $\tilde{V}_i(\mathbf{r},\mathbf{r}_0)=0$ at $z=\pm\infty$ were assumed in deriving the equation.

## SUPPLEMENTS: VALENCE EXCITATION IN ANISOTROPIC DIELECTRIC MEDIA:

The article concentrated on isotropic (or homogeneous) dielectric systems. For valence excitation in an anisotropic dielectric system, such as graphite whose dielectric function parallel to the a–b plane is different from that perpendicular to the a–b plane, the electron energy-loss spectra for volume excitation can be calculated following Hubbard (1955), Tosatti (1969), Tosatti and Bassani (1970) and Wejohann (1974). In this case the Poisson equation is replaced by

$$\sum_{ij}\varepsilon_{ij}\frac{\partial^2\tilde{V}(\mathbf{r},\mathbf{r}_0)}{\partial x_i\partial x_j}=\frac{e}{\varepsilon_0}\delta(\mathbf{r}-\mathbf{r}_0),\qquad(A1)$$

where $i$ and $j$ represent the $(x,y,z)$ components and $\varepsilon_{ij}$ is the dielectric tensor. For an infinitely large system composed of one type of dielectric medium, a Fourier transform of eqn. (A1) gives

$$V(\mathbf{q},\omega)=\frac{e}{4\pi^2\varepsilon_0}\frac{\delta(\omega-2\pi q_z v)}{\sum_{ij}\varepsilon_{ij}q_iq_j}\exp(-2\pi iq_xx_0).\qquad(A2)$$

The differential excitation probability of the volume is thus given by

$$\frac{d^2P}{dzd\omega}=\frac{e^2}{4\pi^3\varepsilon_0\hbar v^2}\int dq_x\int dq_x\, \mathrm{Im}\left(-\frac{1}{\sum_{ij}\varepsilon_{ij}q_iq_j}\right), \tag{A3}$$

where $q_z=\omega/2\pi v$. This type of approach has a dramatic effect on the calculations of volume excitation of carbon nanospheres and nanotubes, while the surface excitation must be calculated using eqn. (2.21) (Stockli *et al.*, 1998).

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