## SUPPLEMENTAL INFORMATION: DERIVATION OF EQUATION 1

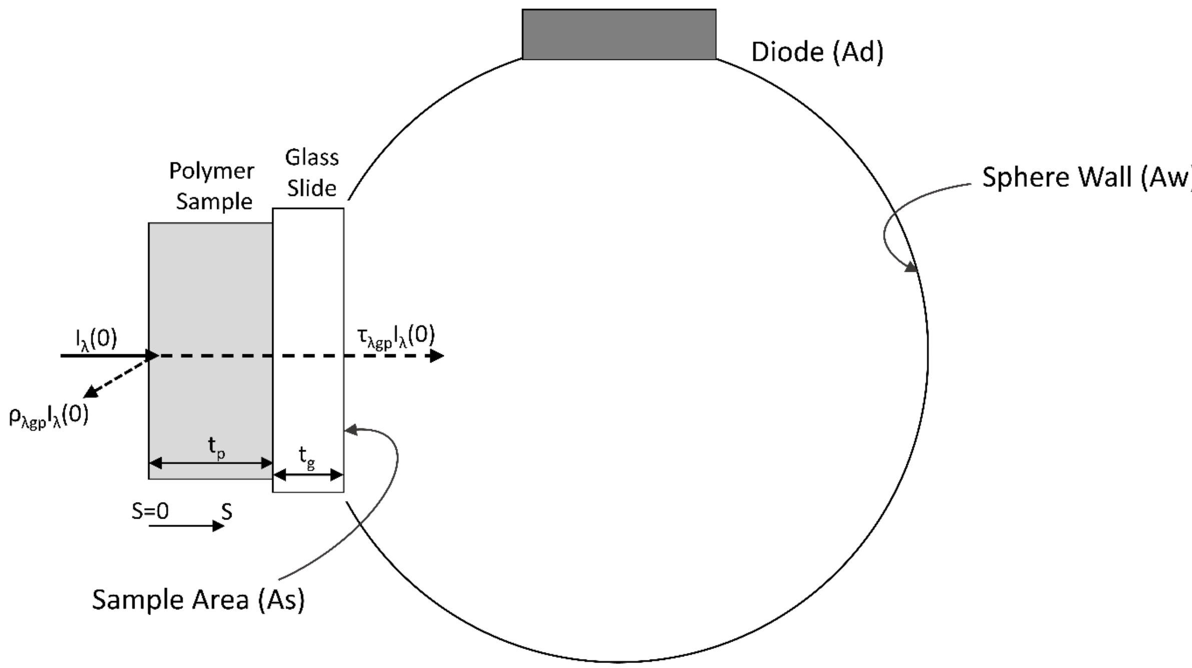


Figure 9: Illustration of spectral intensity irradiating a black AM polymer fused to a glass slide mounted to an integrating sphere

Assume the glass slide and the polymer sample are cold, non-scattering media. The spectral absorption coefficient of the polymer-glass sample can be described with a step function as shown in Figure 10:

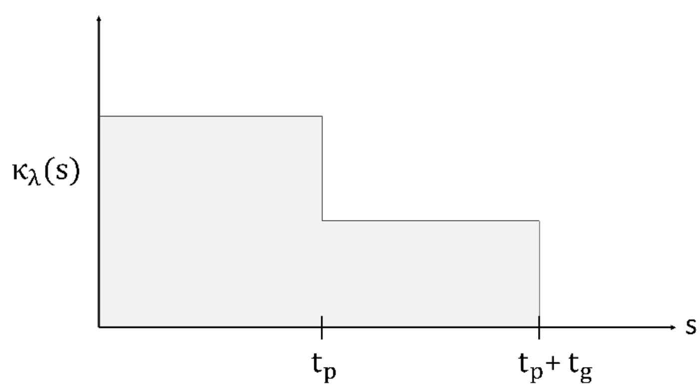


Figure 10: Representative spectral absorption coefficient of a polymer fused to a glass slide

The spectral absorption coefficient is given by Eq. (12) [15].

$$\frac{dI_\lambda}{ds} = -\kappa_\lambda(s)I_\lambda(s) \tag{12}$$

The boundary condition of this equation on the left surface of the sample (s = 0) is:

$$dI_\lambda(0) = I_{\lambda_o}\left(1 - \rho_{\lambda p}^{\perp\perp}\right).$$

Reflections at the polymer sample interface are assumed to be negligible because of the similar indices of refraction. Multiple internal reflections are also assumed to be negligible (see "Justification of Assumptions and Simplifications" in methods section). Separating and integrating Eq. (12) resulted in the following:

$$\int_{I_{\lambda_o}\left(1-\rho_{\lambda p}^{\perp\perp}\right)}^{I_\lambda(t_p+t_g)} \frac{dI_\lambda}{I_\lambda} = -\int_0^{t_p+t_g} \kappa_\lambda(s)ds = -\kappa_{\lambda p}\int_0^{t_p} ds - \kappa_{\lambda,slide}\int_{t_p}^{t_{p+t_g}} ds$$

$$\ln\left[\frac{I_\lambda\left(t_p + t_g\right)}{I_{\lambda_o}\left(1 - \rho_{\lambda p}^{\perp\perp}\right)}\right] = -\kappa_{\lambda p}t_p - \kappa_{\lambda,slide}t_g$$

$$\frac{I_\lambda\left(t_p + t_g\right)}{I_{\lambda_o}\left(1 - \rho_{\lambda p}^{\perp\perp}\right)} = e^{\left(-\kappa_{\lambda p} * t_p\right)} * e^{\left(-\kappa_{\lambda,slide} * t_g\right)}$$

Define: $\tau_{\lambda gp}^{\perp\perp} = \frac{I_\lambda\left(t_p+t_g\right)}{I_{\lambda_o}}$

$$\tau_{\lambda gp}^{\perp\perp} = \frac{I_\lambda\left(t_p + t_g\right)}{I_{\lambda_o}} = e^{\left(-\kappa_{\lambda p} * t_p\right)} * e^{\left(-\kappa_{\lambda,slide} * t_g\right)} * \left(1 - \rho_{\lambda p}^{\perp\perp}\right)$$

$$e^{\left(-\kappa_{\lambda p} * t_p\right)} = \frac{\tau_{\lambda gp}^{\perp\perp} * e^{\left(\kappa_{\lambda,slide} * t_g\right)}}{\left(1 - \rho_{\lambda p}^{\perp\perp}\right)}$$

$$\kappa_{\lambda p} = -\frac{1}{t_p}\ln\left[\frac{\tau_{\lambda gp}^{\perp\perp} * e^{\left(\kappa_{\lambda,slide} * t_g\right)}}{\left(1 - \rho_{\lambda p}^{\perp\perp}\right)}\right]$$

Define: $\tau_{\lambda g}^{\perp\perp} = e^{\left(-\kappa_{\lambda,slide} * t_g\right)}$

$$\kappa_{\lambda p} = \frac{\ln\left(\frac{\left(1-\rho_{\lambda p}^{\perp\perp}\right)\tau_{\lambda g}^{\perp\perp}}{\tau_{\lambda gp}^{\perp\perp}}\right)}{t_p} \tag{1}$$