To ensure the interpretation of the AFM data in Figure 1 is in quantitative agreement with the surface composition measured by TEY NEXAFS in figure 3, calculations of the TEY NEXAFS signal for the 5 hour and 48 hour annealed samples are estimated. We will assume all C_{60} molecules in the As-grown sample, as well as residual C_{60} not incorporated in dewetted mounds in the 5 Hour and 48 Hour annealed samples, form a uniform layer on top of the CuPc, as shown in Figure S1. For the carbon K-edge, the TEY NEXAFS signal is largely due to Auger electrons. We approximate the signal to be due solely to Auger electrons and use textbook quantitative analysis methods well-established for Auger Electron Spectroscopy. We note that TEY NEXAFS creates core holes using photons, where electrons are used in Auger spectroscopy. Equations for the Auger signal intensity are given by [1]:

(1) $$\mathrm{I}_A(\theta) = I_A^{\infty}\left(\frac{1+r_B}{1+r_A}\right) * \left(1 - e^{-\frac{d}{\lambda_A * \mathrm{Cos}[\theta]}}\right)$$

(2) $$\mathrm{I}_B(\theta) = I_B^{\infty} * e^{-\frac{d}{\lambda_A * \mathrm{Cos}[\theta]}}$$

I_i^{∞} is the signal intensity of pure materials, which accounts for molecules having variation in average auger yield per core hole created. Both materials are primarily carbon and have similar density, so we assume $I_A^{\infty} = I_B^{\infty}$. We are interested in the ratio of signals which will cause these terms to cancel. Thus, we set $I_A^{\infty} = I_B^{\infty} = 1$. The $(1 + r_i)$ terms in equation (1) are to account for backscatter of incident electrons, which we assume to be similar for both materials allowing us to approximate r_A = r_B. For simplicity we will only consider electrons leaving at normal incidence, thus let $\theta = 0$. The parameter λ_A is the electron inelastic mean free path which we will determine below. The C_{60} layer thickness is given by d, which is now the only functional dependence remaining in the signal intensity equations.

Equations (1) and (2) now simplify to:

(3) $$\mathrm{I}_A(d) = 1 - e^{-\frac{d}{\lambda_A}}$$

(4) $$\mathrm{I}_B(d) = e^{-\frac{d}{\lambda_A}}$$

The fraction of the TEY signal from CuPc is given by :

(5) $$\frac{\mathrm{I}_B(d)}{\mathrm{I}_B(d) + \mathrm{I}_A(d)}$$

The C_{60} layer thickness is calculated using the C_{60} Volume deposited = $7.6 \times 10^{-21}\, m^3$, measured by QCM , and the volume and 2D projected surface area of dewetted C_{60} mounds, measured by AFM. The volume of the dewetted C_{60} mounds is calculated using the measured heights and assuming the mounds are hemispheres. An effective value for λ_A is calculated from the as-grown data by setting equation 5 equal to the measured CuPc composition by TEY NEXAFS, resulting in $\lambda_A = 1.76 \times 10^{-9}\, m$. λ_A and the estimated C_{60} layer thickness is then used to estimate the TEY NEXAFS signal for the 5 hour and 48 hour annealed samples, assuming that the dewetted C_{60} mounds have no CuPc signal contribution to the TEY NEXAFS signal. The results are in reasonable agreement with the measured values and are shown in Table S1.

Supplemental References

[1]Oura, K.; Lifshitz, V.G.; Saranin A.A.; Zotov, A.V.; Katayama M. *Surface Science*, Springer: Berlin, 2010; pp.86-89.

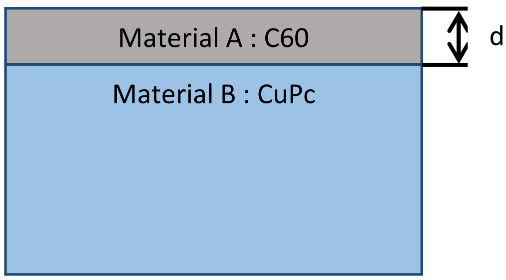

Figure S1. Illustration of assumed sample geometry in regions not occupied by large dewetted C_{60} mounds

Sample	Thickness of C_{60} wetting layer [nm]	Fraction of Surface Area Covered by dewetted C_{60} mounds	Calculated CuPc TEY NEXAFS signal fraction from inter-region (using equation 5)	Calculated Average CuPc TEY NEXAFS signal fraction from the surface	Measured CuPc TEY NEXAFS signal fraction
As-Grown	1.9	0.00	N/A	N/A	0.34
5 Hour anneal	1.6	0.06	.40	0.38	0.38
48 Hour anneal	0.81	0.11	.63	0.56	0.52

Table S1. Comparison of calculated and measured CuPc component of TEY NEXAFS signal