Abstract Submitted
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Surface Energies of Native Oxides on Si(100), Si(111) and GaAs(100) via Three Liquid Contact Angle Analysis (3LCAA) Correlation with Composition by Ion Beam Analysis (IBA)[1] E. OCAMPO LANDEROS, S.M. SUHARTONO, R.T. VAN HAREN, R.P. FRANCIS, Y.W. PERSHAD, M.T. BADE, E.W. DAVIS, A.O. MARTINEZ, N. HERBOTS, S.D. WHALEY, R.J. CULBERTSON, Arizona State Univ., K.L KAVANAGH, Simon Fraser Univ. — Surface energies, γ^T, of native oxides of Si(100) [1], Si(111) and GaAs(100) are measured via contact angles of sessile drops of three liquids (3 Liquid Contact Angle Analysis, or 3LCAA) and correlated with surface composition via ion beam scattering. 3LCAA, based on Van Oss' theory, computes γ^T from Lifshitz-Van der Waals interactions with molecules, γ^{LW}, electron donors, γ^+, and acceptors γ^-. Varying γ^{LW}, γ^+, and γ^- helps optimize γ^T and increase lifetime and reliability in hermetic NanoBonding^{TM} [2], in integrated sensors and solar cells. Liquids used for 3CLAA are 18MΩ DI water, glycerin, and α-bromo-naphthalene in a Class 100 flow hood. Oygen coverage is measured via the 3.038 0.01 MeV nuclear resonance ^{16}O (α, α) ^{16}O.γ^T is found 57 2 mJ/m^2 for Si(111), which is hydrophilic, 50 2 mJ/m^2 for Si(100) and 35 3 mJ/m^2 GaAs(100), which are hydrophobic. Thus, native oxides on GaAs(100) are significantly more hydrophobic (33%) than on Si(100). [1] A.L. Brimhall et al*, Bull. of the APS*, Vol. 60, (2015) [2] US9018077, (2015), Herbots et al

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