Supplementary Materials:

Role of Collectors and Depressants in Mineral Flotation: A Theoretical Analysis Based on Extended DLVO Theory

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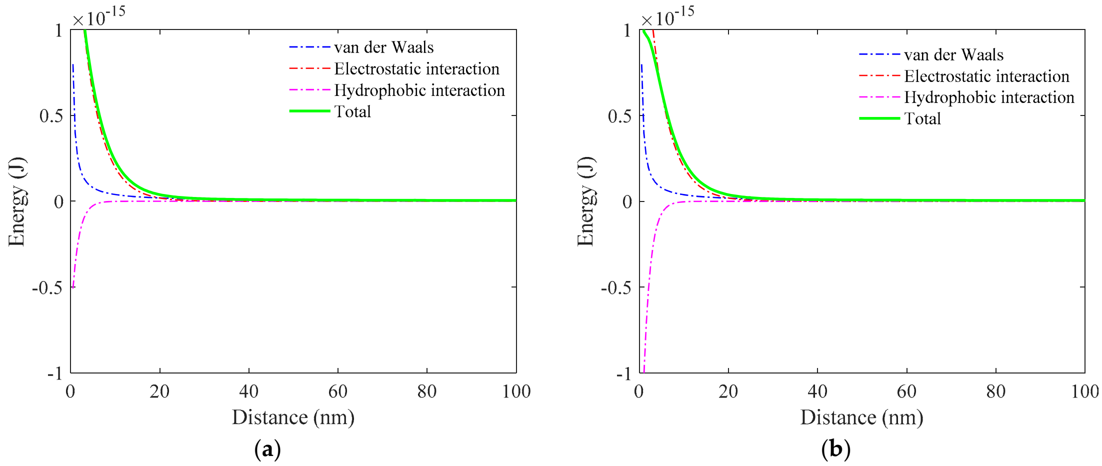

Figure S1. Potential curves between a 200-μm-radius hydrophilic silica sphere covered with hydrophobic hemispherical asperities with different radii and an air bubble in 5×10^{-3} M NaCl solution: (**a**) 0.5 nm; (**b**) 1 nm. The corresponding surface coverage fractions, θ, are 0.0625% and 0.25%, respectively. The number distribution density of asperity, n, is fixed at 7.96×10^{14} m^{-2}. Surface potentials of the air bubble and silica are both −35 mV. The decay length of hydrophobic force is 1.5 nm.

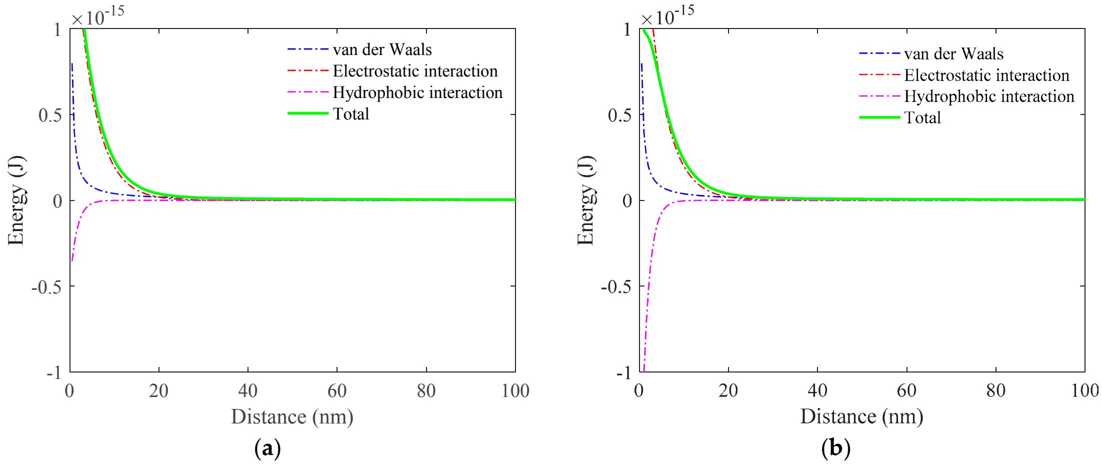

Figure S2. Potential curves between a 200-μm-radius hydrophilic silica sphere covered with different number distribution densities of hydrophobic hemispherical asperities and an air bubble in 5×10^{-3} M NaCl solution: (**a**) 1.99×10^{14} m^{-2}; (**b**) 7.96×10^{14} m^{-2}. The corresponding surface coverage fractions, θ, are 0.0625% and 0.25%, respectively. The radius of asperity, *r*, is fixed at 1 nm. Surface potentials of the air bubble and silica are both −35 mV. The decay length of hydrophobic force is 1.5 nm.

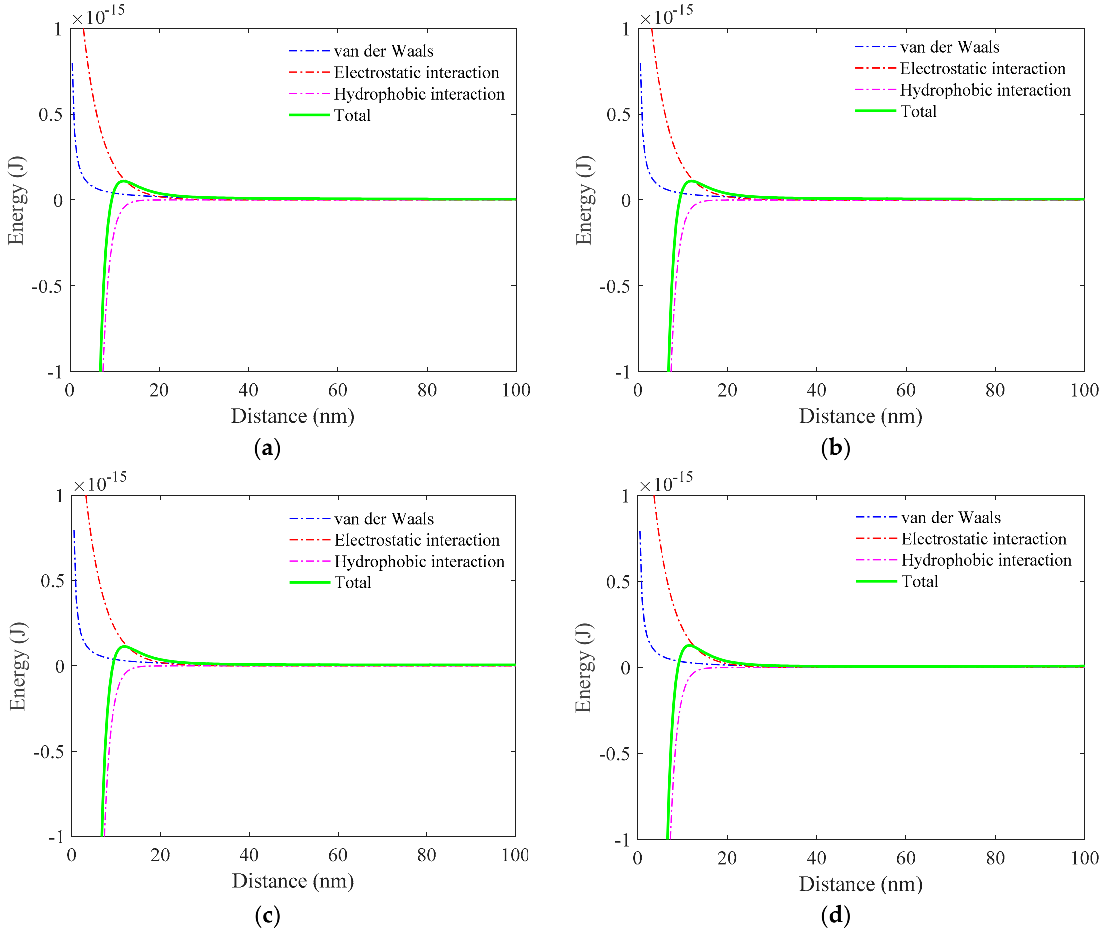

Figure S3. Potential curves between a 200-μm-radius hydrophobic silica sphere covered with hydrophilic hemispherical asperities with different radii and an air bubble in 5×10^{-3} M NaCl solution: (**a**) 0.5 nm; (**b**) 1 nm; (**c**) 2 nm; (**d**) 4 nm. The corresponding surface coverage fractions, θ, are 0.0625%, 0.25%, 1%, and 4%, respectively. The number distribution density of asperity, n, is fixed at 7.96×10^{14} m^{-2}. Surface potentials of the air bubble and silica are both −35 mV. The decay length of hydrophobic force is 1.5 nm.

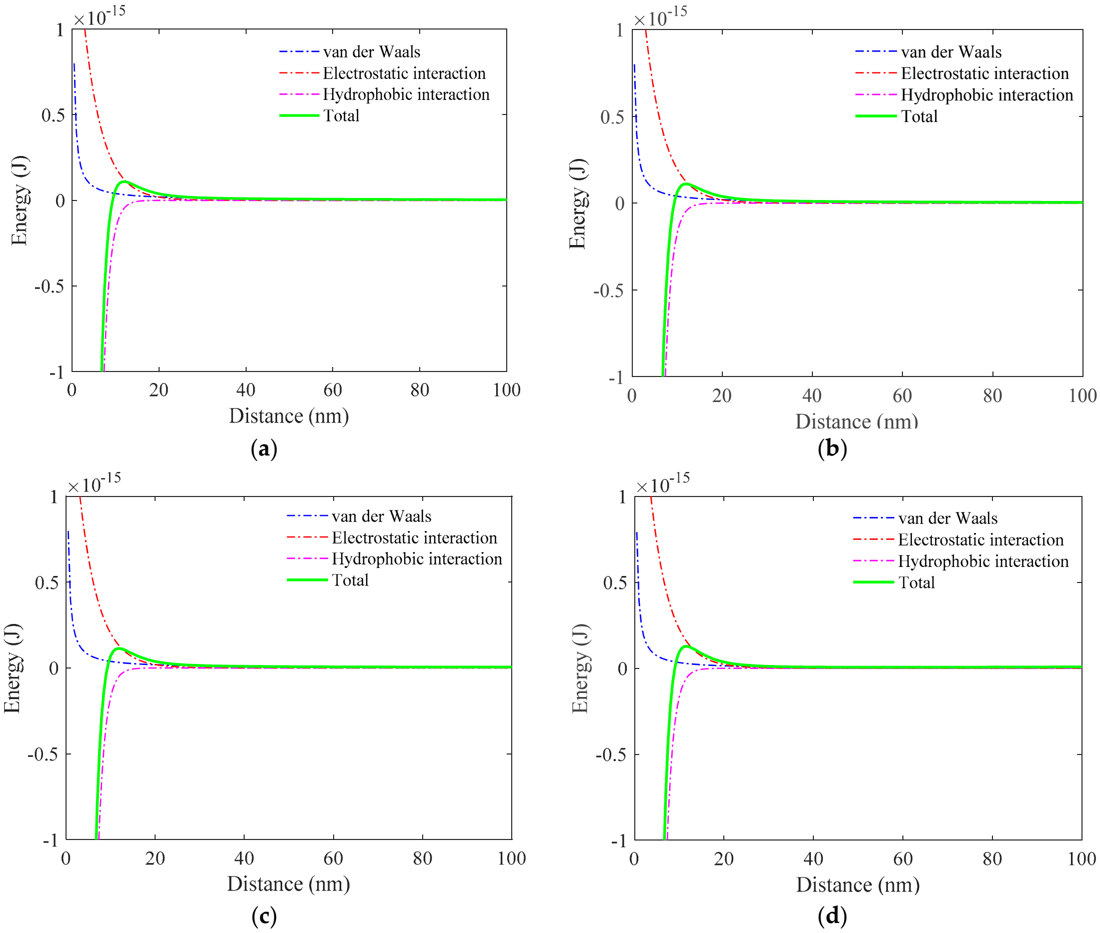

Figure S4. Potential curves between a 200-μm-radius hydrophobic silica sphere covered with different number distribution densities of hydrophilic hemispherical asperities and an air bubble in 5×10^{-3} M NaCl solution: (**a**) 1.24×10^{13} m^{-2}; (**b**) 4.98×10^{13} m^{-2}; (**c**) 1.99×10^{14} m^{-2}; (**d**) 7.96×10^{14} m^{-2}. The corresponding surface coverage fractions, θ, are 0.0625%, 0.25%, 1%, and 4%, respectively. The radius of asperity, r, is fixed at 4 nm. Surface potentials of the air bubble and silica are both −35 mV. The decay length of hydrophobic force is 1.5 nm.