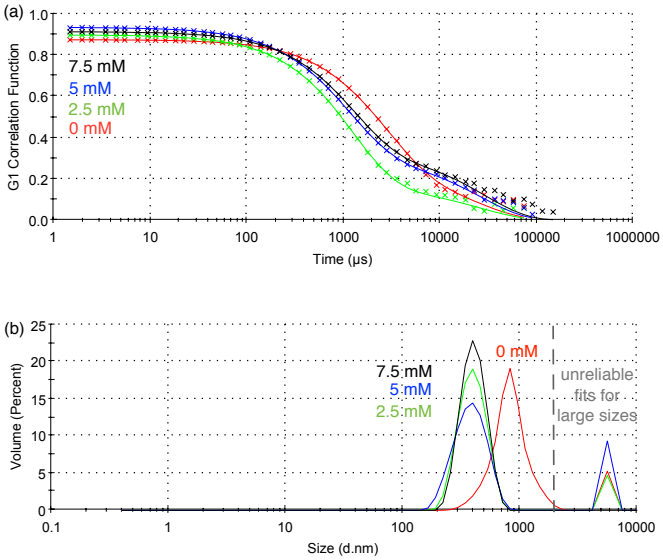

Fig. S1 Representative fits to correlation data from light scattering experiments (top), and the resulting size distribution histograms (bottom), based on a data series that compares results for the same powder sample (biogenic aragonite SA2) suspended with different amounts of SHMP additive. Data collection and fit parameters were performed using the Malvern Zetasizer software automated routines. In the top plot, fits (solid lines) to the correlation data (markers) become poor at times larger than 10,000 μs. Because the longest times correspond to the Brownian motions of the largest particles, we should not trust the validity of the size distribution data for large particle sizes (above $\sim$ 2000 nm, in the bottom plot). If we compare the data for particle sizes less than 2000 nm, we see reassuring trends. First, the suspension with no SHMP shows a higher median size distribution; this is consistent with more particulate aggregation that occurs with the lower ζ value. Second, the size distributions are comparable for SHMP concentrations of 2.5, 5.0, and 7.5 mM. This indicates that any of these SHMP concentrations will have the same effect in keeping the particles dispersed.

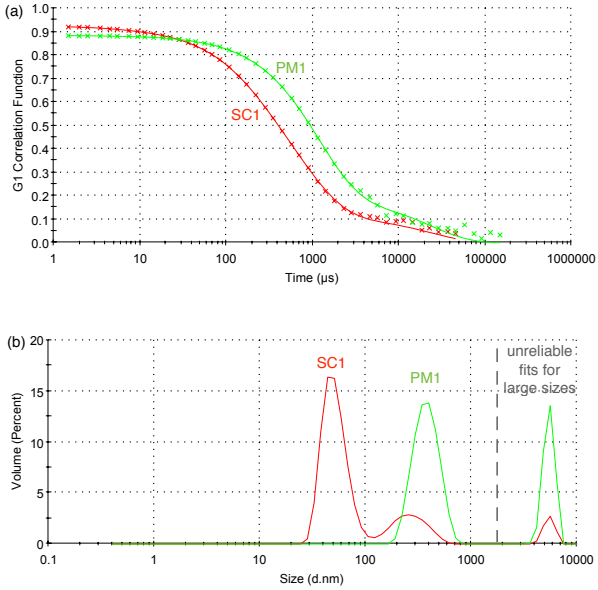

Fig. S2 Representative fits to correlation data from light scattering experiments (top), and the resulting size distribution histograms (bottom), based on data from two different sources of calcite, each dispersed with 10 mM of SHMP. Data collection and fit parameters were performed using the Malvern Zetasizer software automated routines. In the top plot, fits (solid lines) to the correlation data (markers) become poor at times larger than 10,000 μs. Because the longest times correspond to the Brownian motions of the largest particles, we should not trust the validity of the size distribution data for large particle sizes (above $\sim$ 2000 nm, in the bottom plot). If we compare data for particle sizes less than 2000 nm, we see that both samples are rather polydisperse. The spar calcite (red) shows a bimodal distribution (centered at 50 nm and 300 nm), while the modern plaster (green) has a broader unimodal distribution (centered near 400 nm).