BEADS BEHAVING BADLY?

(TIPS FOR WELL - BEHAVED BEADS)

Though our beads are generally quite well-behaved, they are not unlike Gremlins. Treat them well, and they are cute, cuddly, and compliant. Feed them after midnight, and they can turn into little monsters. If you're not sure what we mean, you can either check out the 1984 Warner Brothers movie by the same name, or you can try any of the inadvisable things we have listed below…

Freezing.
Freezing of microsphere suspensions typically causes irreversible aggregation. We could leave it at "don't do it!", but as scientists, we understand that you want to know why. Essentially, water is removed from the suspension as it solidifies, resulting in the segregation and packing of particles. Small particles have so much surface area and the packing is so efficient that they become irreparably agglomerated. Please, if you care about your beads at all, don't do it.

Extreme heat.
Polystyrene can take quite a bit of heat (~94°C+ depending on crosslinking), and silica can take even more (>1000°C) before softening. However, if your protocol pushes the limits, you may find that beads begin to get a bit sticky, and you may find us using terms such as "anneal," "sinter," or "polymer chain re-arrangement" when you call to talk with us about it. If you have coated something like a protein on the surface, we may even toss a few words like "denature" and "degrade" in to the mix.

Contamination.
Though most of our suspensions contain an antimicrobial agent (sodium azide or ProClin®), and we specify refrigerated storage, microsphere suspensions can become contaminated with opportunistic microorganisms as they are opened and used over time. Observing recommended storage conditions and use of as-near-to-aseptic-handling as possible (working in a hood, use of gloves, keeping benches clean, use of clean glassware and pipets, etc.) will aid in minimizing the risk of contamination. Should the suspension become contaminated, it may be possible to re-work and return it to its original condition, i.e. to remove cellular debris, etc. that would compete with ligand for the surfaces of the beads). That said, if it's a small volume, it probably makes sense to throw it out rather than take heoric efforts to rehabilitate it.

Over-centrifugation.
Centrifugation is the most common separation method that is used in microsphere washes and buffer exchanges. We provide a chart in our Microsphere Reagent Development handbook that provides a good starting point for determining the right protocol (time / force). If the protocol is too rigorous, however, beads can become too tightly packed, i.e. irreversibly aggregated. This is especially the case for smallest diameters (e.g. ≤ 0.5µm), for which we suggest use of our Vivaspin® filtration devices rather than traditional centrifugation. Togetherness is good, but we all have our limits.

Solvents.
While most of our polymer bead customers are reasonable folk who work with them in nice and friendly aqueous systems or buffers, there are *others* who require the rigors of an organic solvent system. Depending on bead composition, solvent system, and experimental conditions (time, temp), polymer beads may be more or less sensitive to the effects of solvents. In the most aggressive PS solvents (e.g. toluene, acetone etc.) they will swell or dissolve, while alcohols (e.g. methanol, ethanol) may have little or no discernible effect. Before throwing caution to the wind, we suggest you consult our solvent/non-solvent listing, or give us a call. We won't judge. Really.