

PAINLESS PARTICLES®

Quarterly Global Newsletter

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from



Bangs Laboratories, Inc., 9025 Technology Drive, Fishers, IN 46038-2886

Tel: 317-570-7020 Fax: 317-570-7034 E-mail: info@bangslabs.com Web: www.bangslabs.com

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10th Anniversary for BangsLabs

On April 1, 1998, we’ll celebrate 10 years in business. Yes, this is the *real* date. And, yes, I know it’s April Fool’s Day—but Sonia and I thought it was a good day to start a new business!

We will be celebrating our good fortune at having great products served by excellent employees to fantastic customers like you all! I guess it’s unusual for a small company to stay in business for 10 years, and for that we are especially grateful to all of you, our loyal customers. We *might* be doing something right!

So what happens next? Well, we are right now involved in an introspective look at ourselves with a view to strategic planning for the *next* decade of Bangs Labs. This is a very interesting and helpful process. We are examining our past and present and we will come up with an action plan to address what we see as a *very* bright future for our business.

Can you help us? Do you have any ideas about what we are doing right and/or wrong, any constructive criticism, any ideas for markets or products which we should seriously consider? If so, we would really like to hear from you.

New Microsphere Selection Guide

Please check out the reorganized guide—with new **catalog code numbers** to classify our products. Don’t worry—old *stock numbers* are cross-referenced. Please call for help or to make suggestions.

Lowest Cost Supplier

(Last quarter in this column we urged you to use us as your only supplier.)

Since last time, I have twice had contacts with *non-customers* who said that we offered great technical service, but they buy their beads elsewhere. They apparently think our microspheres are too expensive. I decided that the reason is that we have not done a proper job of explaining *several facts about this business*. I will try to correct that now!

1) **Microspheres are not a commodity** like caustic soda. They vary somewhat from manufacturer to manufacturer, from process to process, and from lot to lot. We represent the best beads made—obtained from several different sources (each with its own strengths) or made by us (*i.e.*, silica and *ProActive*® beads). We are not limited to only what we make. You give us your specifications and together we pick *the best* for your job. How important is *one-stop shopping* to you?

2) **Quality must be verified.** Do not take for granted that each and every lot will work for you. When you work with us, you will tell us what you want and our dedicated QC department will check appropriate lots to make sure that *your* specifications for % solids, diameter, acid content (for COOH-modified beads), and microbial count are met. How many times have you received problematic shipments from another supplier? How do you (or they) check or know if there is a problem? What are “no-worry” raw materials worth to you?

At most microsphere producers the person who makes the beads also QCs them. How critical is the QC there? How often do they reject their own work?

3) **Microspheres should be guaranteed.** Ours have a “Better-Than” guarantee, meaning that we will send you the best beads we have or can get. If there is any problem, we will work with you and try to help fix it (whether microsphere-

related or other). And, if our beads are the problem, then we will unquestioningly take back what you bought and refund all your money. Any consultations from our >25 years of experience are free. Isn’t that “better than” fair?

4) **You will need technical service.** There will be some problems and you will need to ask product and application questions. What level of service is important for you? What you see on our website and in our TechNotes is only the tip of the iceberg. Behind the scenes are four people dedicated to tech service with 1, 4, 5, and 25 years of experience with latex microspheres and applications.

5) **You might need help choosing the exact beads you need.** Our folks are dedicated to microspheres. No one is distracted by selling diagnostic kits or other unrelated stuff. We will take the time to help you pick out the best beads for your application, packaged the way you want them.

6) **Go for the lowest overall cost microspheres.** Cheapest price may not be a good deal. Ensure that the beads you get are really trouble-free (*e.g.*, no size surprises or % solids problems), easiest to use (packaging that *you* want), and, all things considered, the *least expensive* for you in *your* application.

Beads from most suppliers come in standard packaging of liters at 10% solids (~100g per bottle)—fine if you need exactly 1 liter per batch of your product.

If to make a batch of your product, you need only 40 g (or 400 ml), then you might need to stir or roll a liter bottle to completely and uniformly resuspend the beads. This is especially true for larger (>0.5µm) or magnetic particles, which settle in water. How long must you roll? How do you validate complete resuspension every time? How many person-hours does all this take?

Then you would need to pipet out a 400 ml aliquot for use. (cont. on page 2)

How do you ensure that everybody always takes exactly 400ml so each lot of product uses the same amount? What are the differences in lots? After two lots, how much is left in the bottle? What are the losses? What do you do with the leftovers (sounds like a typical home refrigerator problem)? What are the true, *total* costs to use microspheres this way? How much better would it be to get 400 ml packages (or whatever size and % solids you need) so no one needs to roll and aliquot and waste any latex? What is such service worth to you? Where can you find such service? (Call us for the answers.)

7) **Winners work with winners.** We are the largest (in number of products and in employees) supplier of microspheres in the world. We have 15 people dedicated to the microspheres business *only*. We sell *no* diagnostics kits. We work with, and do not compete with, our customers. If we couldn't sell you the microspheres that you need, in the form you need them, delivered to you when you need them, at a fair price, how could we stay in business and grow for 10 years? Our prices *must be* competitive!

Give us a chance to prove what I promised above. Contact us for a price quote or whenever you think we might help.

ProActive® Ready for Prime Time Streptavidin & Protein A Microspheres

If you liked them before, you'll *love* them now! After two years of steady improvements, we now have a truly great set of products ready for you! We have worked internally and with several large customers to develop a coating process which provides very good binding capacity and proven stability for real ligands of interest. Please call/write to tell us of your need, and we'll tell you what we have ready now and what the real-world binding capacity (for small to large molecules) is for each.

We have coated everything from small (30 nm) microspheres through several kinds of magnetic particles to large (>10µm) beads. We also have coated some dyed microspheres with these versatile binding proteins. Contact us for a detailed list of what's available now.

"WWWhat's up (on the web), Doc?"

"Microsphere Matters"

In February we added a users' forum where *you* can contribute questions and answers of a general nature about getting

and using microspheres of all types. Please look it over and feel free to participate.

Downloadable TechNotes (from the web)

We currently have 11 of our most popular TechNotes up on our website and more are being added weekly (see p. 4 for list).

Read any ~~Good~~ ^{Bead} Books Lately?

Our new "bible" is Greg Hermanson's new book, **Bioconjugate Techniques** (ISBN 0-12-342336-8). He blends theory and very practical protocols. Very helpful for you biochemical bead bonders!

Also, in KPL's December newsletter, **BenchMarks**, see the *very* helpful article, "The Use of Antibodies in Immunoassays" by Martin Blankford. We have some copies or contact KPL at www.kpl.com or phone: 301-948-0169.

Missed The Latex Course?

Buy the Book!

If you couldn't make the last offering of this popular course in October in San Francisco and London, you can still buy a copy of the course notes. At \$350 per book (plus shipping) for >500 pages, it's a good deal (<\$1.00 per page). We accept "plastic money" (VISA & MasterCard). Check our website (www.bangslabs.com) for details or ask us for a copy of the course brochure (list of speakers and lectures). When the books are gone, you'll have to wait for next time and we have not yet planned where or when we will run the course again.

Can't wait? We can design and give a course customized for your organization. Please call to discuss what *you* need—anything from a short lecture/discussion for a few "lab rats" to a three-day full-scale course with several speakers and lab demos for >100 people from R&D, QC, production, marketing, and purchasing. We can do that. (We have *done* it!)

□□□□ We try to simplify the particles business for you and break things down to basics. Don't assume anything, but ask for the information, particles, and prices you need and we'll tell you what we can (and cannot) do.



Cartoon reprinted with special permission from Sidney Harris.

Ask “The Particle Doctor”[®]:

Large Hydrophilic Beads

Q: I have some of your larger beads (100-200 μm), but they are hydrophobic. How can I get hydrophilic beads this size? I found some references for creating active surface groups on the beads (one was in your 1984 book *Uniform Latex Particles*), but these references mentioned reacting the beads with “fuming red” nitric acid and sulfuric acid followed by reducing agents to yield amino groups. I’m not a chemist, all those acids sound scary, and I only want them to be hydrophilic!

A: If you’re about done whining, I’ll tell you how to do it.

1) You are right! Concentrated acids like glacial acetic acid and fuming red nitric acid are *very* nasty to work with. Be *very* careful! You should get some help from a chemist at your place. You will need a plastic apron, full face mask, elbow-length rubber or plastic gloves, and boots.

2) If you just want to make hydrophilic beads, then you could simply mix beads with *ordinary* “concentrated nitric acid”, which is *only* saturated (a bit easier to work with) but not as concentrated as “fuming red nitric acid”, which is super-saturated in NO_2 . The nitric acid will etch the surfaces and create hydrophilic groups (like -OH or -COOH groups), but it probably won’t put nitro groups on the surface. You don’t need nitration, only etching. If you want to go this way, you can also forget about the glacial acetic acid in that recipe mentioned in my book.

For hydrophilic (not nitrated) beads you can just etch the beads for a few minutes, then drain the beads, by pouring off the nitric acid through a glass frit funnel. Then rinse thoroughly with water (do this *very carefully* since water added to acid will generate lots of heat!) and see if beads are hydrophilic enough. If you place some on the surface of a beaker of water, do they float (hydrophobic) or sink (hydrophilic) and do they cling together in water (hydrophobic) or are they water-dispersible (hydrophilic). If you leave them in the acid too long, they will dissolve, since the acid just keeps on etch-

ing.

3) If you do this work with the help of a chemist (this is highly recommended), ask the chemist if he/she has or can make any chromosulfuric acid. This is made by mixing potassium or sodium dichromate

into concentrated sulfuric acid. When I was in grad. school doing surface chemistry a long time ago (we only had four elements then), we used this reagent to clean glassware and it chews up anything organic. It will etch and oxidize the bead surfaces, making them hydrophilic. (It will probably make them disappear, if they are left in there long enough.)

4) It is possible to treat the beads with an electrical plasma in the presence of gases like O_2 , NH_2 , etc. to create hydrophilic surfaces, but I have no experience with this.

5) Some of our beads are made by suspension polymerization processes which put an inorganic coating on the beads. These will have natural hydrophilicity. Apparently your beads were not made this way.

6) We can make beads hydrophilic, if there is enough need. We just add the appropriate hydrophilic monomer during the final stage of polymerization. But we must know what you need with enough notice to make it for you in time.

Let us know about any of your project needs early enough so we have time to make what you need when you need it.

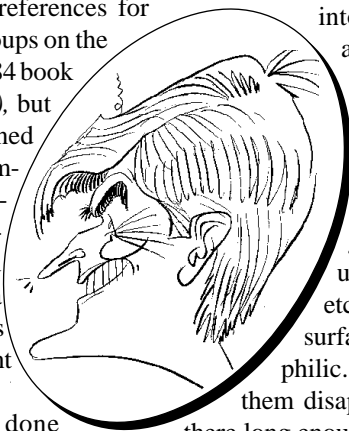
Organic Particles?

Q: With all the concern about health now, I just want to be sure: Are your particles grown organically?

A: I assure you that our microspheres are 100% organic— except for the silica beads, which are 100% inorganic!

New Surfactant-Free Microspheres

We now have >12 lots in sizes from <300 nm (polystyrene) and <750 nm (carboxylate-modified PS). They have optimal levels of sulfate surface groups: enough for stability, but not enough to interfere with adsorption or covalent binding. Very low residual monomer. Uniform, stable, reproducible. Ask us about them.



Mail Bonding (Do the “write” thing!)

✉ “I am interested in knowing any problems that may result in getting my tongue pierced. If you could send me information, I would greatly appreciate it. My mother is in fear of nerve damage. Is this a valid concern?” (Anon., actual message from our website) I think the nerve damage has already been done! (It’s fun out there.)

✉ “I need to isolate cells from... I was thinking of perfusing microspheres coated with..., allowing the cells to migrate onto the beads and then isolate the beads. The beads must be 10-50 μm and they would have to be administered sequentially by size. I figure magnetic beads would be most convenient for isolation. How about it? You have any ideas? If successful you would have a whole new market and probably save my career at the same time.” (E Levin, La Jolla CA) Wow! You start out to peddle microspheres—and one day, suddenly, you’re a *career-savior*! Actually, we handle questions like this every day. We can help and we will take time to discuss your problem, offer advice, and suggest the beads for your use (apparently some competitors just ignore such questions). Even if we don’t sell you anything, we’ll try to make a friend and leaving you a bit better off after your call.

✉ “I like your TechNotes a lot, and *Painless Particles* is fun, but very redundant for regular readers. Maybe you could compile the info in there better on the web with a searchable index.” (A Pralle, Heidelberg) Thanks for your note. We continually add new people to our mailing list. Our challenge is to satisfy long-time readers with *new* information, yet cover the basics for beginners. Some points are so important (and so often overlooked) that they need to be repeated, so a certain amount of redundancy is unavoidable. Putting old NL’s on the web in searchable format is a cool idea, but doesn’t eliminate the need to continue to cover basic concepts.

Please visit us at: www.bangslabs.com

Leigh B. Bangs

Leigh B. Bangs, Ph.D.
The Particle Doctor
leigh@bangslabs.com

P.S. Try our Reprints and TechNotes