## More Sample Preparation for SEM and X-ray Microanalysis

Don Chernoff, Small World

A common application for SEM is particle characterization of powders. The question that always arises is how can you mount particles on a stub and get a well distributed mono layer of particles? This is important when performing x-ray analysis on individual particles. Good separation of particles becomes critical if you are using image analysis software to identify individual particles and measure their size. Most image analysis software identifies particles based on gray level separation from their surrounding area. This usually leads to errors measuring particles that are touching or nearly touching each other. Subsequent automated x-ray analysis of the identified particles also relies on separation and will also suffer from errors when trying to analyze particles that are touching. Anyone who has tried mounting a powder sample to achieve separation knows it can be very frustrating.

I would like to suggest a simple technique which works amazingly well. All you need is your normal stub, some double sided carbon smooth sticky dots (available from most microscopy supply companies), a sheet of paper, and a source of compressed air. Attach the sticky dot to the stub. If you do not have these sticky dots, double-sided tape will do, but it will be very non-conductive and must be coated after the powder is put down. Next, place a small amount of the powder sample at one end of a sheet of paper. Gently roll up the paper and hold the stub at the end opposite end the powder. You will have something like a paper tube with powder at one end and a stub, with the sticky side facing into the tube, at the other end. A quick blast of compressed air at the powder end will send the particles airborne and they will attach themselves to the stub in a well dispersed pattern. It may take a little practice to get it right but it is the best method I have seen for getting a good dispersion of fine particles onto a stub.

I would like to thank Jeff Kingsley at Charles Evans and Associates for this tip. ■

## E.M. Site A.C. Magnetic Fields (Sources, Surveys and Solutions)

## Part 1: Introduction

Curt R. Dunnam, Linear Research Associates

A decade of energetic debate regarding possible hazards of corporeal a.c. magnetic field exposure has at least alerted us to the fact that significant time-varying magnetic fields exist in most workplace environments. Although the personal risk from exposure to such alternating magnetic fields on the order of 1 to 20 milligauss is demonstrably small (if it exists at all), peak-to-peak field variations in this range can easily wreck havoc at electron microscopy sites, particularly when FEGs are involved. Complicating the a.c. magnetic field interference problem is the fact that environmental fields are seldom steady-state, instead changing frequently as electrical loads in a building are switched on and off. A major consequence is that the resulting EM interference symptoms are often intermittent and correspondingly difficult to diagnose and remedy. Even in the steady-state case, resolution loss caused by low-level a.c. magnetic fields is often mistakenly attributed to conducted vibration or some ill-defined instrument maladjustment. In other instances, subtle resolution loss can arise without the operator's cognizance when new equipment and\or power wiring is installed in the same building. Even nearby elevators can create significant magnetic interference by distorting the geomagnetic field during passage. Obviously, in any of these instances, correct initial diagnosis of time-varying magnetic fields as the interfering agent will save considerable time, effort and money.

In the next few issues of *Microscopy Today* we will present a brief serialized primer in which common EM site time-varying fields and typical EM interference thresholds are described, and which will include practical tips on surveying and magnetic field attenuation. This series will be largely drawn from a half-day seminar which the author has presented before client organizations during the past year. Explanations of magnetic source and field phenomena will be on the level of "physics for non-majors", where physical causes and effects are presented without the benefit (or burden) of extensive analytical review. Nonetheless, this series should instill confidence in those readers who wish to conduct meaningful a..c. magnetic field surveys and correctly interpret the data collected. In the course of this series, we will illustrate various physical principles of magnetic sources and fields by examining several interesting, arguably bizarre, site interference examples drawn from actual survey and mitigation work. ■