



Figure 2: Carbon fibers in epoxy matrix. Sample courtesy Virginia Polytechnic Institute. 40 μm scam

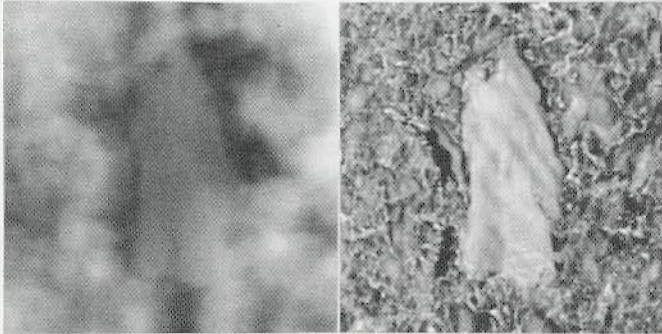
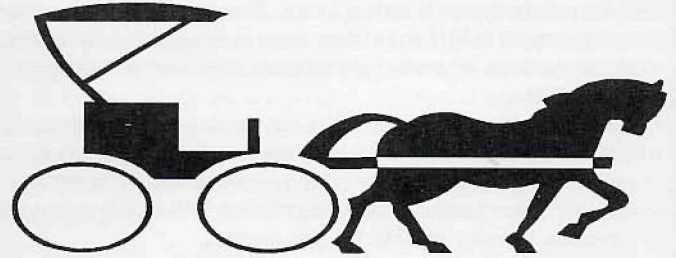


Figure 3: Carbon black deposit in automobile tire rubber. 15 μm scam

A Note on Molybdenum Apertures

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Unfortunately nature did not provide us with a perfect metal for fabricating electron optical structures. Even for the restricted field of apertures we must accept engineering compromises. Molybdenum is one of the good choices, which many of us use, but in a demountable system such as the microscope it must occasionally be cleaned. Unlike platinum, it cannot be cleaned by firing outside the vacuum in a reducing flame and one must be careful not to mistake it for platinum. It can be mechanically cleaned in air and washed with solvents and mild acids (check your hand book). Haine was perhaps the first to point out that it can be fired in a modest vacuum at 1400 deg C in a platinum or tungsten boat. This works quite well but eventually leads to trouble if frequently used. The problem arises from the fact that molybdenum has a very limited solubility for carbon and at saturation begins to form carbides which are insulators and are not reduced by firing in vacuum. To avoid this problem, first remove the bulk of carbonaceous film by mechanical cleaning. The small amount that is left will decompose during firing and the carbon which enters the aperture surface will be harmlessly dissolved in the metal. ■



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