MICROTOME SECTIONS OF CHARCOAL
– Technical Note –

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SUMMARY

This note describes and illustrates a rapid and user-friendly method to section fragile charcoals by microtome after applying two component adhesive to the transverse charcoal surface and using adhesive tape to prevent the sections to disintegrate.

Key words: Charcoal, sectioning, two component adhesive.

Today, archaeology without charcoal analysis is unimaginable. The success of environmental reconstructions with charcoals from Palaeolithic to modern times is documented in hundreds of publications (e.g. Schweingruber 1976; Dufraisse 2006). Most studies are based on observations of surfaces made with scanning electron microscopy (Gonçalves et al. 2012) or episcopic light microscopy. Broken and uneven surfaces allow unambiguous wood identification but photographic documentation of anatomical structures with light microscopy is difficult. For sectioning charcoals and making planar surfaces, Schweingruber (1978) proposed an embedding method with an artificial resin, where pieces of charcoal are soaked in methyl methacrylate that fills all cavities. After polymerization, the pieces can be cut on an extremely stable wood microtome. This method consistently produces high quality results but the embedding process is time consuming and the sectioning demands a special microtome.

Figure 1. Charcoal covered with adhesive tape in a microtome holder.
Here, I present a simple and easily applied method. A drop of a mixture of two-component adhesive, e.g. Araldite, is put on the transverse side of a broken charcoal surface. The liquid fills all cavities and polymerizes within 30 minutes, after which the surface can be planed with a normal microtome. This procedure stabilizes the fragile carbonized structures. In the next step, a small piece of transparent self-adhesive tape (Scotch Magic tape) is attached to the surface (Fig. 1), and the microtome knife is pulled through the charcoal at a sharp angle and a thickness setting of 20–30 microns. The section adheres to the tape and can be mounted on a slide (Fig. 2). At this point, the section is ready for microscopic observations (Fig. 3). By using a mounting medium, e.g. Canada balsam, the slides remain permanent, but the adhesive tape has to be kept intact, to preserve integrity of the charcoal section.

The procedure does not work for longitudinal sections because the fragile carbonized structures split within the adhesive. Detection of longitudinal cell wall structures, e.g. perforation plates, are possible on thick sections slightly skewed from the perpendicular direction.

References


