two elements in low carbon steel. Although the effect of one in the absence of the other has not been determined, there are indications that phosphorus and nitrogen exert additive effects and, with the exception of strain aging behavior, the relative amounts of both elements must be considered in evaluating either. In the case of strain aging, phosphorus apparently contributes so little that the aging behaviors of high and low phosphorus steels with the same nitrogen contents are virtually indistinguishable.

Based on the results of this study, it may be concluded that, from a practical standpoint:

1. Nitrogen variations in low phosphorus steel have a greater effect on its properties than similar variations in high phosphorus material.
2. Phosphorus variations in low nitrogen steel produce a greater change in properties than similar variations with high nitrogen contents.
3. Deoxidation with aluminum, and certain other elements, alters the above observations. Thus, the degree of nitrogen "fixation" is of importance and must be known for intelligent evaluation of steel quality based on chemical composition. Recent developments in the field of analytical chemistry indicate that such determinations are now within the realm of practicability.

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Special Mounting Techniques

by Earl C. Roberts

TO facilitate some recent microscopic investigations it was necessary to devise special mounting techniques for the polishing of two quite different metallographic specimens. These techniques are extremely simple and are submitted for whatever value they may be to other investigators.

The first specimen mount proved very satisfactory for the study of untempered martensite. Since it was undesirable to heat the specimen, lucite or bakelite mounting materials could not be used in the conventional manner. A cold mount was made by drilling a hole of the same diameter as the specimen in a cylindrical piece of polystyrene then pressing the steel specimen into the hole on an ordinary vise. A prefabricated disk of lucite should work equally well. The only precautions necessary are that the hole be drilled out cleanly and the piece of steel be pressed into the plastic uniformly, otherwise the mount will crack.

The second type of mount was required for the study of slag specimens by reflected light. Mounting these specimens in bakelite and then attempting to rough finish the surfaces on graded emery papers resulted in a considerable amount of chipping and breaking out of the slag particles. This made further satisfactory polishing almost impossible. It was found, however, that if the bakelite-mounted specimen was first rough finished to a point where a good specimen surface became visible, the interstices in the specimen surface could be filled and the polishing completed. This filling was accomplished by placing a small amount of lucite powder in the bottom of the steel specimen mold then reinserting the bakelite-mounted specimen on top of the lucite powder. Reheating the mold to the proper temperature and applying the required pressure resulted in the formation of a thin disk of lucite on the bottom of the bakelite specimen. By carefully grinding the lucite away a uniform surface including the slag specimen was obtained and further polishing was unhampered by slag disintegration.

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