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Cathodic Arc Plasma Deposition: Principles and Trends

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Cathodic arc plasmas have outstanding properties because they are fully ionized metal plasmas. Ions are unusually energetic and are often multiply charged. Because of these features, superior metal and compound films can be made that are well adherent, dense, and smooth, provided that the infamous macroparticle problem is solved. Progress has been made in the design of macroparticle filters, and first versions are commercially available. Most cathodic arc deposition today is for hard compound films such as TiN and TiAlN on cutting tools, building hardware, and jewelry. These films are made without filtering. New applications are emerging, including ultrathin diamond-like carbon coatings, semiconductor metallization, and optical films, where filtered arc deposition is gaining importance.