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The trajectory of the secondary electrons in the magnetic field and this determines the form of the erosion race track in a magnetron cathodeStephen Muhl¹, Johans Restrepo², Julio Cruz³¹Instituto de Inv. en Mats. UNAM, Mexico, Mexico ²Sadosa, Mexico, Mexico ³CNyN UNAM, Ensenada, Mexico

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Magnetron sputtering involves the collision of gas ions from a magnetically confined plasma with the surface of the cathode target, with this resulting in the emission of atoms from the target towards the substrate. The shape of the racetrack in the target is dependent on the distribution of the ions incident on the target, and this depends on a combination of the strength and configuration of the magnetic field. In this study we have measured the spatial distribution of the magnetic field of different diameters and types of magnetron cathodes, each of different maximum magnetic fields. We compared that magnetic field data with the geometry of the erosion racetrack in the corresponding targets. The results showed that the inner and outer edges of the racetrack correspond to given value magnetic field vectors. We report the relationship between the configurations of the racetrack profile and the magnetic field. We have also simulated the trajectories of the secondary electrons emitted from the cathode surface and relate these to the form of the plasma and the lateral distribution of the energy of the ions incident on the target.

KeywordsMagnetron sputtering
racetrack
magnetic field