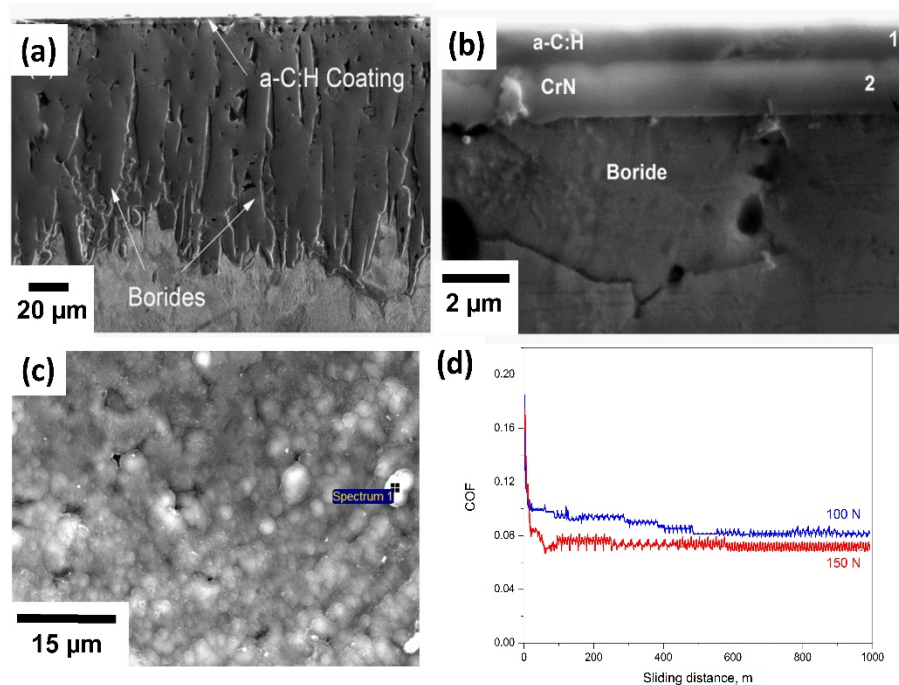


## Duplex Surface Treatment of Steel



Wear is the most common reason for the mechanical failure of the engineering components. It involves many complex surface interactions. Such interactions are mechanical as well as a chemical in nature. Wear and friction are interlinked phenomena. Elimination of wear is a difficult task. However, it can be minimised using the appropriate surface modifications and coating technologies. In duplex surface treatments, a surface modification technique is combined with the coatings to achieve the optimum tribological properties. Under a given condition, wear behavior is dependent on the combination of surface engineering methods that are applied to the contacting surfaces. Therefore, our objective is to study the wear behaviour of the commercially important AISI 4140 steel specimens with various surface conditions against the DLC-coated boronized disc of AISI 4140 steel. Specific wear rate and coefficient of friction (COF) of the as-boronized (AB) pins at 100 and 150 N loads are substantially lower than the boronized-polished (B-P) pins. In case of the DLC-coated pins, underlying boronized surface has outperformed the hardened-tempered surface. The higher hardness of the underlying surface has imparted the better wear properties. DLC coating on both contacting surfaces has observed to be very effective in enhancing the wear resistance. DLC coating on the both contacting surfaces gave the lowest specific wear rate, which was about 30 times lower than the B-P pins. Improved performance of the as-boronized (AB) surface against the B-DLC surface in the aggravated conditions has been observed.

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