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Effect of the microstructure and residual stress on tribological behavior of induction hardened GCr15 steel

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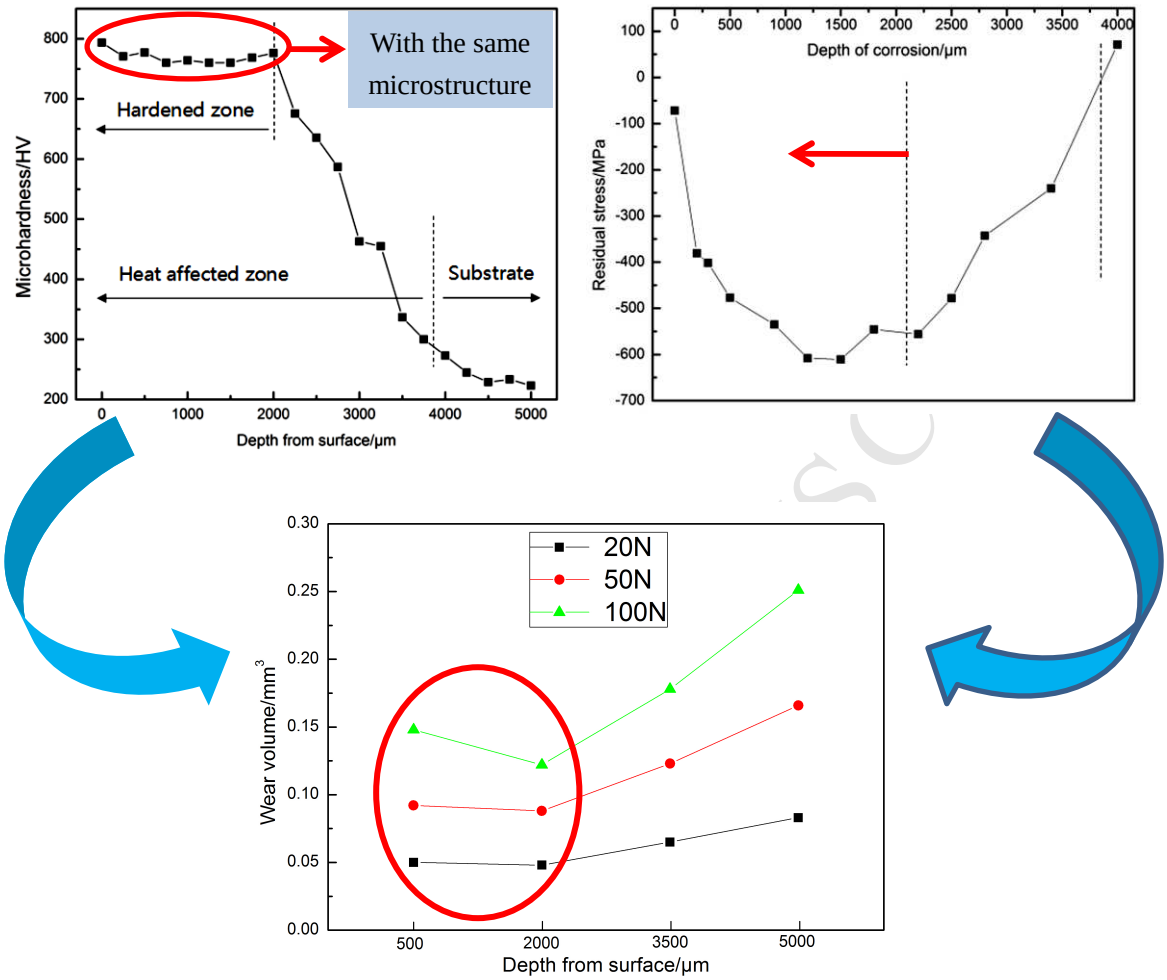
Graphical Abstract



The pictures show the GCr15 steel's distribution of microhardness and residual stress along depth profiles after induction hardening and the wear volume at different depth with different loads. It is obvious that the hardened zone (at depth of 500 μm and 2000 μm) is superior to the substrate in wear resistance. In addition, the most important is that the wear volume at depth of 2000 μm with high residual compressive stress was lower than that of 500 μm in hardened zone with the same microstructure and microhardness. It is indicated that the high compressive stress is advantageous for wear resistance.