













## 8. Conclusions

After conducting laboratory mechanical tests on all samples thermally treated and compare the results before and after thermal treatment it can be conclude the following:

1. Capability of tensile strength has been improved due reducing the size of the granules, which led to increased grain boundaries.
2. Increasing in fatigue life of the thermally treated alloy
3. The appearance of roughness on the surface treated thermally, which led in increasing the friction in addition to the deposition of carbides toward the surface which contributed emerging a coherent surface layer resulting in an increase in the rate of wear
4. Exciting excess in fatigue cycles because of the metaphase changes for the basis of the alloy.

## References

- [1] Willam D. and Callister Jr. " Fundamentals of Materials Science and Engineering" John Wiley & sons, Inc. U.S.A. (2001).
- [2] Callister.w.d. " Materials Science and Engineering and Introduction " John Wiley and Sons. Inc. New York, PP. 274-395. (2003).
- [3] Bollton W. " Engineering Materials Technology " 3<sup>rd</sup> Edition Butter Worth-Heninemann, London, U.K. (1988)..
- [4] A.F. Padiha,R.L.Plaut ,P.R.Rios;ISIJ " Main Thermal Treatments and Transformations That accurin Austenitic Stainless Steel Between room Tempture and the Liquid State " International (japan),PP. 43-143,2003
- [5] .Ramond .A. Higgins"Engineering Matallurgy Part 1 Applied Physical Matallurgy Sixth Edition"B.Sc(Brim),c,Eng.F.I.M
- [6] . J. R.Davis ( ED )" ASM Speclality Hand Book Stainless Steels " ASM International ,Materials Park, OH 1994
- [7] Donald R. Askeland The Science and Engineering of Materials Sixth Edition" University of Missouri—Rolla, Emeritus, PP.520, (2010)
- [8] Van Vlack H.,"Elements of Materials Scince and engineering ",5<sup>th</sup> Edition ,Wesley PUBLISHING Company,Inc .,U.S.A (1985)
- [9] . R. E. Smallman & R. J. Bishop " Modern Physical Metallurgy and Materials Engineering Six Edition " ISBN 0 7506 4564 4 PP. 296,(2002).
- [10] George E .Totten,Phd.,FASM "Steel Heat Treatment Metallurgy And Technologies ,Portland State University ,Oregon U.S,A PP. 703,(2006).
- [11] Xiaohui Zhi & Jiandong Xing ,"Effect of heattreatment on microstructure and mechanical properties of a Ti-bearing hypereutectic high chromium wite cast iron".Materials science &engineering . A 487, PP. 171-179, (2008).
- [12] Tadayon Saidi & Varahram "Efect of Heat treatment Cycle on the Mechanical Properties of Machinable Austempered Ductile Iron"METAL . 22-5-2007
- [13] Bashir Ahmad Ikhlas and Siraj Hussein Ibrahim Ghaida "The impact of thermal treatment on the corrosion resistance of carbon steel in the water of well sulfur "

Tikrit Journal of Engineering Science PP. 14-25, vol. 19, Issue 3, September 2012.

- [14] Alondaoui Jamal Nevin "effect partial thermal treatment on the mechanical properties of the solid high-carbon used in preparing the active parts of the molds pieces on the cold cutting ," Engineering and Technology magazine, Aalcild 27, No. 5 Industry, 2009.
- [15] Hanna Asim Walid, Qais Laith Abbas, Abdul-Jabbar Najam Manar "study the effect of hardening among polymer on some properties of the alloy stainless steel type (316L)., Journal of Engineering and Technology, Vol. 27, No. 10, (2009)

## Author Profile



**Nadum Ibrahim Naser** had M.Sc. degree in Material Engineering from Belgrad University. He received B.Sc. degree from university of Belegrad, collage of engineering in Mechanical Engineering. He is a lecturer in Dour Technical Instiute-Tikrit. He presents many papers in national journals and participates in number of conferences.