

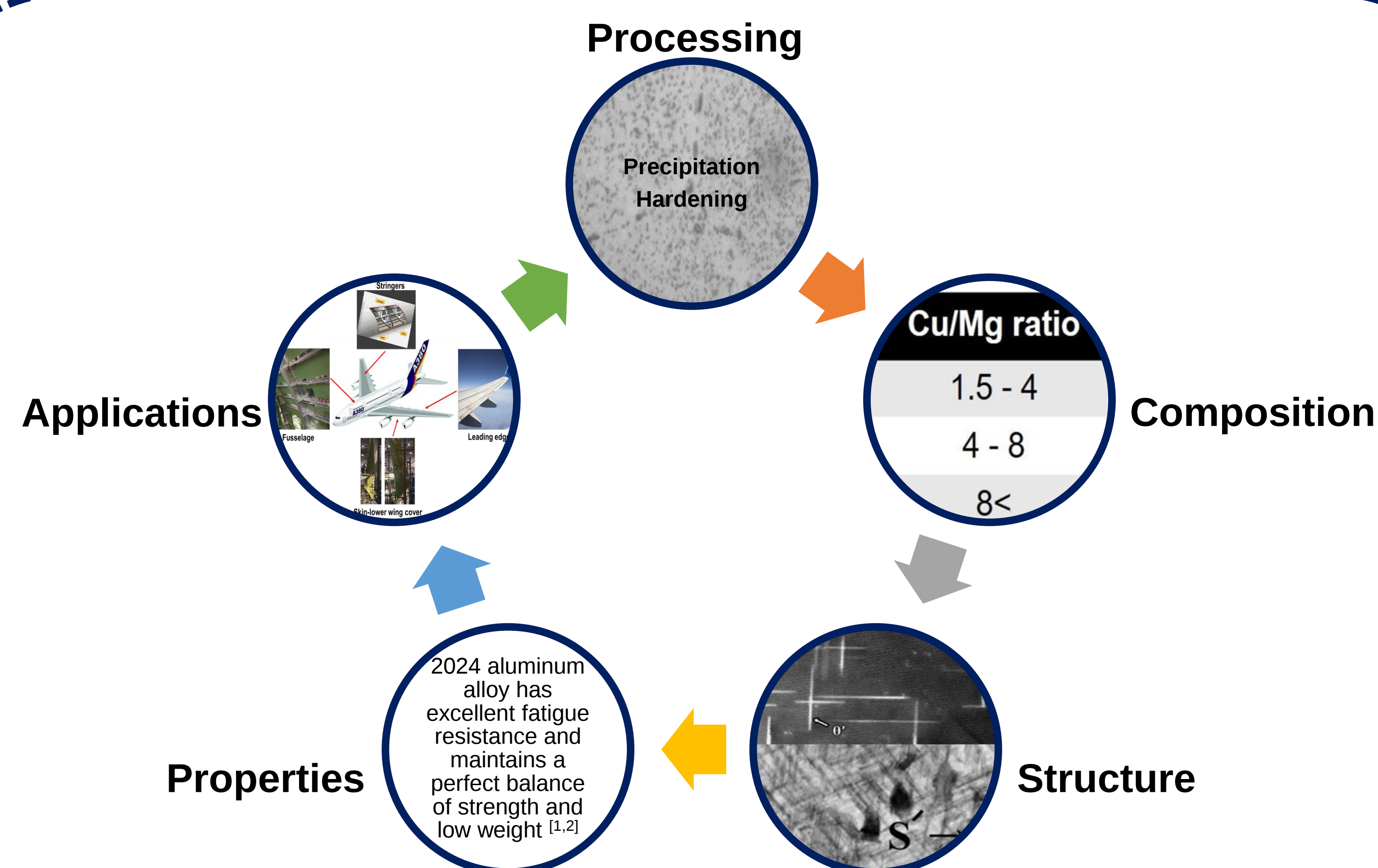
Effect of Cold Rolled on the Static Precipitation in Aluminum 2024 Alloy

Guía-Tello J.C¹, Garay-Reyes C.G¹, Medrano-Prieto H.M¹, Ruiz Esparza M.A¹, Rodriguez-Cabriaes G¹, Maldonado-Orozco M.C² and Martínez-Sánchez R¹.

¹Centro de Investigación en Materiales Avanzados (CIMAV), Laboratorio Nacional de Nanotecnología, Miguel de Cervantes No. 120, Chihuahua, Chih., C.P 31109, México.

²Universidad Autónoma de Chihuahua, Facultad de Ingeniería, Circuito No. 1, Nuevo Campus.

1.- INTRODUCTION



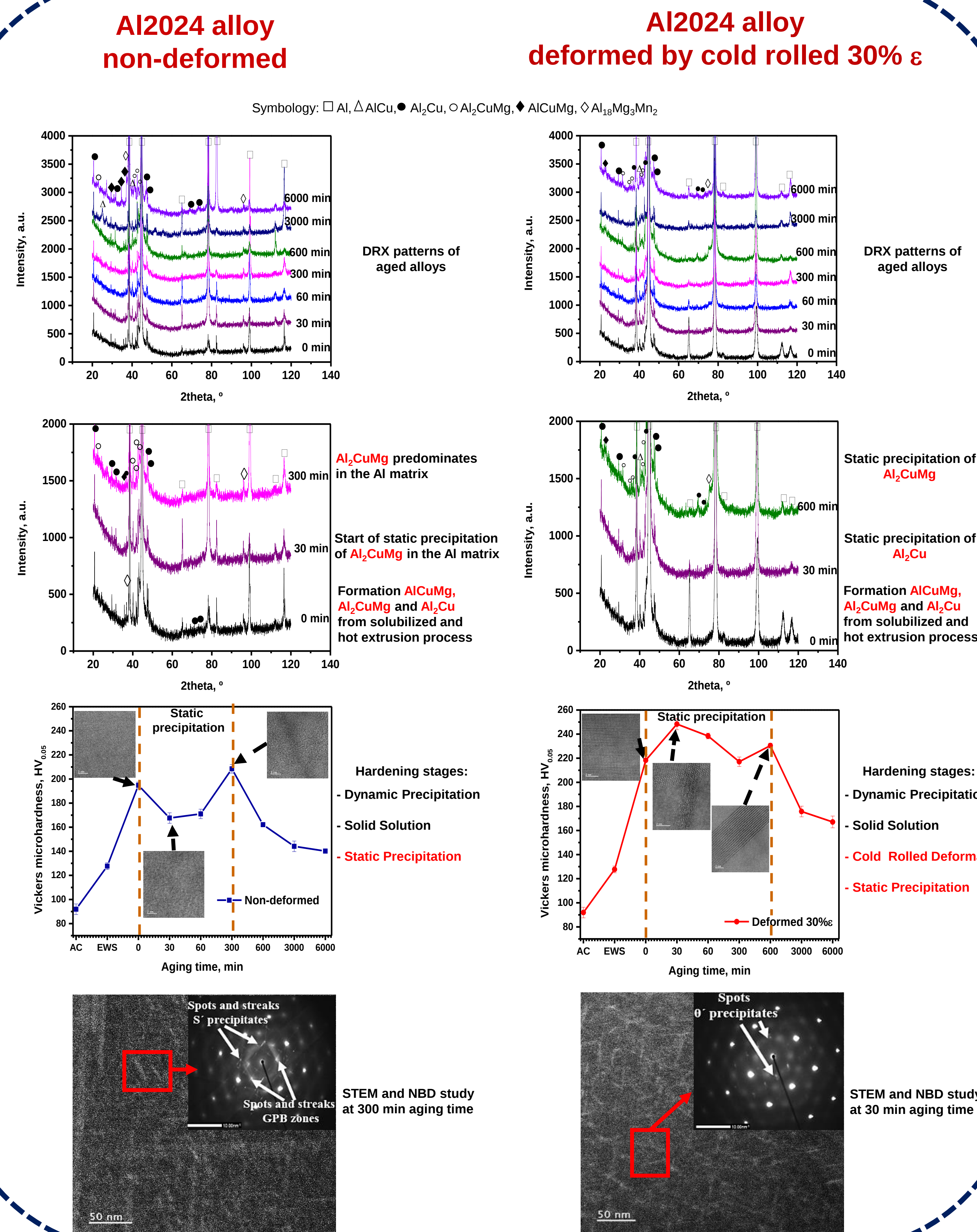
2.- OBJETIVES

1. By means of X-ray diffraction and microhardness tests, to evaluate the effect of the deformation by cold rolled on the static precipitation in 2024 aluminum alloy and to compare the results with regard to non deformed 2024 aluminum alloy.
2. To establish a correlation between the microstructure and the microhardness values obtained by means of the evaluation of the morphology and types of precipitates formed after of aging stage.
3. To determine the optimal aging time for to obtain high values microhardness in deformed and non deformed 2024 aluminum alloy.

3.- METHODOLOGY



4.- RESULTS



5.- CONCLUSIONS

- The deformation of the Al2024 alloy cold rolled at 30%ε modifies the precipitation mechanism and higher microhardness values are obtained with regard to the not deformed Al2024 alloy.
- Cold working produces double strengthening peak in microhardness curve of deformed samples, being the first peak with the highest value (248 HV ± 4.7) to 30 minutes aged, attributed to θ precipitates (Al₂Cu). The second peak (226 HV ± 8.3) to 600 minutes occurs due to the precipitation of S phase (Al₂CuMg).
- Microhardness curve of samples non-deformed only show a strengthening peak (208 HV ± 3.6) to 300 minutes, attributed to S precipitates (Al₂CuMg) as predominant phases.

6.- REFERENCES

- [1] Wang S.Q., Schneider M., Ye H.Q., Gottstein G., "First-principles study of the formation of Guinier–Preston zones in Al–Cu alloys", Scripta Materialia, Vol. 51, No. 7, 2004, pp. 665–669.
- [2] Li Siyu, Zhang Jin, Yang Jinlong, Deng Yunlai, Zhang Xinming., "Influence of Mg Contents on Aging Precipitation Behavior of Al–3.5Cu–xMg Alloy", Acta Metall. Sin. (Engl. Lett.), Vol. 27, No. 1, 2014, pp. 07–114.

7.- ACKNOWLEDGMENTS

Guía-Tello J.C. expresses his gratitude to National Council of Science and Technology in Mexico (CONACYT) for the posdoctoral scholarship provided. The authors are deeply grateful to Msc. Karla Campos Venegas, Msc. Ernesto Guerrero Lestarjette and Msc. Carlos Elias Ornelas Gutiérrez for their valuable support in the characterization of Al2024 alloy.