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**Bending of CR4 steel: Lattice strain measurement****Gupta Tilak Raj***Injectoplast Pvt. Ltd, India*

**Statement of the Problem:** In this work, effect of deformation and different orientations on CR4 steel sheet at lattice constant, crystallite size and lattice strain has been analyzed.

**Methodology & Theoretical Orientation:** The samples were prepared by air bending using 1mm thick CR4 steel. Air bending was carried out on a universal testing machine, using various sheet orientations, constant size of the specimen, constant process parameter and same tooling. Further, for analyses of deformation and orientation on CR4 steel, X-ray diffraction spectroscopy was performed. The samples were cut by wire electric discharge machining (WEDM) and polished for X-ray analysis. Qualex 2.1 software was used for analyzing the peaks, lattice constant was analyzed using Bragg's law and lattice strain using Williamson-Hall's method. Crystallite size was analyzed by Scherer's method and Williamson-Hall's method.

**Conclusion & Significance:** The lattice constant is found to be the smallest on rolled face and after bending it increases along thickness. Further, the lattice strain was observed compressive in nature for all the three orientations. However, for 0-orientation lattice strain (0.5%) was found to be more across the thickness as compared to 90-orientation lattice strain (0.34%). Furthermore, the crystallite size was analyzed by Scherer's method and Williamson-Hall's method, respectively. It is found that the crystallite size by using Williamson-Hall's method is smaller than by using Scherer's method. Further, crystallite size is observed to be the smallest on the rolled face. Moreover, after application of bending force enhancement in the lattice strain is observed while the size of the crystallite is reduced noticeably.

**Biography**

Gupta Tilak Raj has obtained his PhD in Mechanical Engineering from Punjab Technical University and M.E. in Polymer Technology from University of Delhi. Presently, he is working as Vice President, Technical / Product Development, at Injectoplast, Kanpur-India and involved in the development of parts, assemblies and sub-systems for automotive industries. Since last 25 years (Jan.1997 onward). Previously, he was engaged in teaching of P.G. Diploma (Tool Design and Manufacture) & Diploma Tool & Die Making, student at Tool Room & Training Centre, (Now DITE), an Indo- Danish Project, Delhi-India for 17 years (Jan.1980-Dec.1996). His research interests are in the field of processing of metals and, polymers, product engineering and tool engineering. He is a Fellow member of the Institution of Engineers (India), designated as C. Eng. (I) FIE and Life Member of Indian Society for Technical Education

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