**Abstract**

[Ultrasonic](https://www.sciencedirect.com/topics/physics-and-astronomy/ultrasonics) [non-destructive evaluation](https://www.sciencedirect.com/topics/materials-science/non-destructive-testing) (NDE) technique has been used for characterisation of evolution of microstructure in β-quenched and thermally aged zircaloy-2 specimens. On-line ultrasonic velocity measurements have been made in β-quenched state of zircaloy-2 (A specimen) during heating at different heating rates up to 573 K (B specimen), 603 K (C specimen) and 623 K (D specimen) with holding time periods of 5 h for specimens B and C, and 2 h for specimen D, at the corresponding maximum temperature, by employing a specially designed experimental set-up. The observed change in velocity at room temperature (298 K) before and after ageing for specimens B and D is 0.52% and 0.48%, respectively, and this reveals that [intermetallic](https://www.sciencedirect.com/topics/physics-and-astronomy/intermetallics" \o "Learn more about Intermetallics from ScienceDirect's AI-generated Topic Pages) precipitates are formed during the aging treatment. Ultrasonic measurements are correlated with the hardness, density and microstructural changes.