Effect of silicate structural units on optical and mechanical properties for automotive windshield glasses

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**Abstract**. The Windshield glasses of the Maruti Alto 800 (A800), Hyundai i20 (Hi20), and Maruti Suzuki Eeco (MSE) are taken from an automotive repair shop to investigate their structural and optical properties to check their durability. Fourier transform infrared (FTIR) was used to study the fundamental mode of vibrations and structural units present in available windshield glasses. The UV- visible spectroscopy was used to determine the transparency of these windshield glasses. The Makishima-Mackenzie model has been used to study mechanical properties such as elastic modulus (E), bulk modulus (K), shear modulus (S), longitudinal modulus (L), hardness (H), and Poisson ratio ($σ$). It is found that the structure of glass A800 is highly depolymerized due to the presence of the most prominent Q2 unit and constant transparency throughout the variable range.