

GHz P wave buffer rod-transducer and its application to DAC experiments

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GHz ultrasonic velocity measurements was developed for future diamond anvil cell experiments. First of all, ZnO transducer was coated on the bottom surface of diamond anvil by a sputtering machine. Simulation tests were conducted by using a single diamond anvil; expected accuracy of ~0.1 % was confirmed for ~50 ns travel time of ~160 micron meter thickness glass plate. However it was turned out that the direct diamond ZnO transducer technique has potential difficulty for actual DAC experiments. i.e., durability of ZnO layer. In order to solve the problem, P wave buffer rod made of sapphire single crystal was developed newly. The usage of the P wave buffer rod is now under examining.

Keywords: GHz ultrasonic technique, diamond anvil cell, P wave buffer rod