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The use of silicone based adhesives to encapsulate manganin gauges for high stress experiments ILAN BE'ERY, ZVI ROSENBERG, RAFAEL, P.O. Box 2250, Haifa, Israel — The use of commercial manganin stress gauges has been limited to stresses in the range of 0-20 GPa due to the shortcircuiting of their encapsulating materials (epoxy, Kapton) at higher pressures. Researchers at Lawrence Livermore overcome this difficulty by embedding their gauges in Teflon sheets and measured shock pressures as high as 40 GPa. The fact that Teflon can keep its resistivity at high pressures is attributed to the lack of benzene rings in its structure. On the other hand, Teflon is difficult to work with as an encapsulating material because of its poor adhesive properties. In order to overcome this difficulty we encapsulated our foils in between two tapes of Teflon which have a silicone adhesive glued to it. These are 50 μ m thick commercial tapes (manufactured by 3M, type #60) which have a 50 μ m thick silicone adhesive (PSA – pressure sensitive adhesive) on them. This adhesive is easy to work with, has no benzene rings in its structure and has a lower carbon content, compared to other adhesives. Several experiments were conducted in order to directly measure the resistivity of these tapes at high pressures, as well as using them to encapsulate our manganin foils for high pressure studies.

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