

## ***Interactive comment on “What happens to Fracture Energy in Brittle Fracture? Revisiting the Griffith Assumption” by Timothy R. H. Davies et al.***

**Anonymous Referee #1**

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These experiments with Pyrex are interesting but there may be some weaknesses. 1) Only four tests are performed. The other data are taken from another source (Kolzenberg et al., 2013). 2) The kinetic energy of the fragments is not measured and thus energy considerations are not possible. The energy budget put into the system by compression should be the equal to the energy taken up by the fragments, by the acoustic, thermal energies, and by the energy used up to create new surface. Without estimating these forms of energy, it is difficult to conclude that fragments take up vibrational energy. In other words, one should demonstrate the presence of an energy deficit. 3) The figure in Fig. 8 shows the experimental data on the surface-energy plane. Three of the new data cluster at about 40 J. There is one isolated point at higher energy. This graph shows that more surface is created as consequence of energy loaded into the

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system. If it were only for the data from this work, one would draw a fitting line between the four points. Adding the data from Kolzenberg et al. (2013) shows that data points are very much dispersed. It becomes difficult to find a fit. The general conclusion is that new surface approximately increases with energy, which is reasonable. 4) The energy per unit surface decreases as a function of the energy put into the rod (Table 3). It is possible that fragments acquire some internal energy as suggested here in addition to the kinetic, but this is still conjectural. 5) Application to geological phenomena is unclear, given the level of uncertainty. The paper would be strengthened with more tests. Moreover, other important forms of energy should be measured and/or better constrained.

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