DISCUSSION

P. K. Liaw[1] (*written discussion*)—Why are crack growth rates at 77 K faster at 0.1 Hz than at 10 Hz?

Y. Katz et al (*authors' closure*)—The effect of frequency on the FCPR has been addressed by Yokobori et al [*9*],[2] who propose a kinetic model that is associated with dislocation generation and activation processes. Accordingly, FCPR is expected to be lower at higher frequencies. Clearly, the case of fatigue crack propagation below the DBT temperature, where the cleavage mode takes place, requires a modified view and explanation. Moody and Gerberich [*4,19*] attempted a dislocation dynamics model based on cleavage growths steps. They assumed that the dislocations along the rivers of a propagating crack control cyclic cleavage. Here also, the frequency is introduced and results in a similar trend, namely that high frequency is associated with relatively lower FCPR values.

During the present work frequency effects have been studied experimentally at low temperatures (Fig. 5). According to our knowledge, these data are not available in the literature. It should be emphasized that although the general trend which has been suggested by Moody and Gerberich [*4,19*] was confirmed, there are still difficulties in verifying their proposed relationship quantitatively. We believe that the whole issue is more complex below the DBT. There are several variables that have to be considered (e.g., adiabatic heat, strain rate effects and, mainly, the role of the characteristic distance needed for cleavage). These variables are competitive and therefore some of the expected frequency effects might be reduced even at low temperatures.

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[2] Citations of references and figures refer to the main body of the paper.