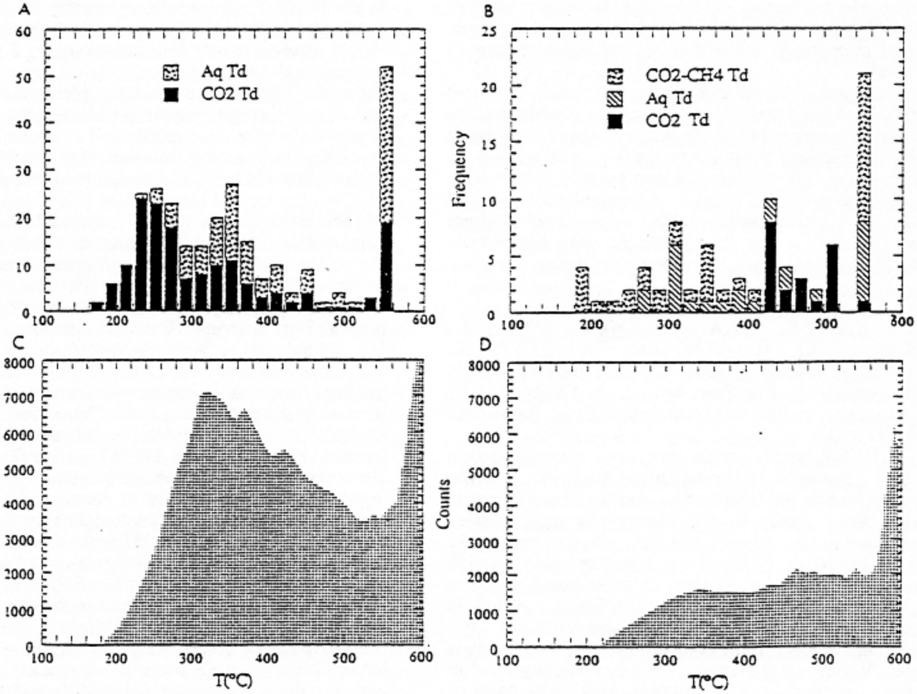

Figure 1. Histograms of decrepitation T determined by visually monitoring individual I from mineralized (A) and barren (B) samples; Acoustic decrepigrams of mineralized (C) and barren (D) samples

MAVROGENES, J.A., McQUEEN, K.G., BODNAR, R.J. and BURLINSON, Kinsley, 1993, Decrepitation, microthermometric and compositional characteristics of barren versus auriferous mesothermal quartz veins (abst.): Archiwum Mineralogiczne, v. 49, no. 1, p. 145-148 [ECROFI XII]. First author at Fluids Research Lab., Dept. Geol. Sci., Virginia Polytech. Inst. and State Univ., Blacksburg, VA 24061.

Various workers have proposed that acoustic decrepitation characteristics of FI may successfully discriminate between [barren] quartz veins and those containing Au. Recognizable differences in the shapes of decrepigrams of barren versus mineralized mesothermal quartz veins has been attributed to the presence of abundant, high density CO_2-rich FI in mineralized samples and their rarity in barren veins.

The goal of this study was to test the conclusion reached by Burlinson (1991, J. Geochem. Explor., v. 42) that the difference in decrepigrams of mineralized vs. barren veins at the Cowarra Au district in southern N.S.W., Australia are related to the relative abundance of CO_2 FI.

Decrepigrams comparing the optically determined decrepitation characteristics of mineralized and barren quartz for the various I types are shown on Figures 1A and 1B. The pure CO_2 (type 3) and the aqueous-CO_2 (type 2) I showed similar decrepitation behavior, and are grouped together and labeled CO_2 Figures 1A and 1B. All samples show a major peak at the α/β transition (573°C). Mineralized samples all show characteristic peaks at 240°C and 340°C. The 240°C peak is due to the decrepitation of CO_2-rich (type 2 and 3) FI, while the 340°C peak is due to both CO_2-rich (type 2 and 3) and aqueous (type 1) FI (Fig. 1A). Mineralized samples do not contain methane-bearing (type 4) I. Barren veins not only contain CO_2 (type 2 and 3) and aqueous (type 1) FI, but also contain numerous CO_2-CH_4 (type 4) FI. Aqueous (type 1) I in the barren veins decrepitate over a T range similar to those in the mineralized samples. However, CO_2-rich (type 2 and 3) FI in barren veins show a decrepitation peak at a higher T (440°C) than those in the mineralized veins. The CO_2-CH_4 (type 4) I decrepitate between 180°C and 320°C, with no characteristic peak, effectively smoothing out the lower T range of the decrepigram (Fig. 1B).

Acoustic decrepigrams obtained from the same samples are compared in Figures 1C and 1D. Both the optically determined and the acoustic decrepitation patterns show a significant peak at low T (200-400°C). Our results confirm the earlier conclusions of Burlinson that this intense peak in the low T region of decrepigrams from mineralized quartz veins is due to the presence of abundant CO_2-bearing I. These I are much less common in the barren veins. Moreover, we have identified CO_2-CH_4 I which are restricted to the barren veins and which decrepitate over a wide range at T $\leq$ 350°C. (From the authors' abstract by R.J. Bodnar)