al. 1989).The inversion of the low to the high form of cristobalite occurred at 250°C to 260°C on heating **(Sandford s. &Cole, 2011). 7)** The heat absorbed by the hydrothermal quartz (- 141 m J) is greater than that of pegmatite quartz (- 56.6 m J) during the inversion of low quartz to high quartz (Figs.3 and 5).This may be attributed to the higher specific heat of hydrothermal quartz than that of pegmatite quartz. Healing in fluid –filled cracks in quartz is rapid above 400 °C and is thermally activated as the specific heat of hydrothermal quartz is so higher than that of pegmatite quartz (**Susan et al, 1990**).The study reveals that, hydrothermal quartz is lighter in the specific gravity (2.55) than the pegmatite quartz (2.64), so it is more sensitive to heating than the pegmatite quartz and has higher thermal expansion coefficient and lower thermal conductivity. This introduces a lot of strain that causes the material to crack by heating.**8)** pegmatite quartz has one endothermic peak at 296**°**C , may be related to the homogenization of fluid inclusion or to converting the amorphous silica to cristobalite .**9)** Pegmatite quartz has thermal activities above the alpha / beta inversion temperature of quartz at 700°C ,798°C & 887°C (Figs. 5, 6) ,may be related to homogenization of melt inclusions (**Jadhav et al , 1993)**. The complete miscibility is attained at the critical point 712°C **(Thomas et al , 2000). Chryssoulis and Rankin (1988)** found that **,** quartz is not stable at 870°C and do not converted into tridymite in the absence of fluxes.**10)** The variations in decrepitating activities can used as an aid to mineral exploration in granite terrains.

4. Conclusion and Utilization

The study revealed the following conclusions:

1. Hydrothermal isolated crystals of quartz does not show undulose extinction but shows thermal expansion microcracks at 482°C.The pegmatite quartz shows undulose extiction as a result of the anisotropy of thermal expansion of quartz grains in groups
2. The decrepitation temperatures extending from ~270°C to 780°C, but more fluid inclusions decrepitated in the 5°C range from 582°C to 587°C (α / ß inversion temperature)
3. Slow rate of heating is accurate for differentiation between hydrothermal and pegmatite quartz. The first has thermal activity below the alpha-beta inversion temperature, and the second has thermal activity above the inversion temperature.
4. Slow heating rates yield a more accurate and truly representative inversion temperature.
5. Increasing degree of grinding makes disappearance of the inversion temperatures
6. The alpha- beta inversion temperature of natural quartz is strongly affected by the change in pressure , particle sizes , heating rate but slightly affected by the source of quartz (regardless the thermal activity below and above the inversion temperature for both quartz types)
7. Description and identification of fluid inclusions in natural quartz taking in consideration the factors affecting the inversion temperature is good tool in mineral explorations and can be used for the distinction between the authigenic and detritus quartz of sediments.

References

[1] [1] Amoros, J.L, Garcia, J. Orts, M.J. Mestre, S., Bachero, L., Qualicer (2000): Effect of quartz particle size on the thermal expansion of porous white ware bodies. World Congress On Ceramic Tile Quality, Castellon, V. 3, N.12–15, P. 35–37.
[2] Barker, C. and Robinson, S. J. (1984): Thermal release of water from natural quartz, American Mineralogist, V.69, P.1078-1081.
[3] Birkeland, T. and Carstens, H. (1969): Preliminary report on high temperature investigations of natural quartz," NGU Project" B 2006 (in Norwegian).
[4] Bodnar, R. J.,Binns, P. R. and Hall, D.L (1989): Synthetic fluid inclusions –V1. .Quantitative evalution of the decrepitation behavior of fluid inclusions in quartz at one atmospheric confining pressure. J. metamorphic Geology, 7, P, 229-242.
[5] Chryssoulis, S. L. and Rankin, A. H. (1988): Decrepitometry of fluid inclusions in quartz from the guadalcazar granite of Mexico; principles and application to mineral exploration. Mineralium Deposita , V. 23, Issue 1, P. 42-49.
[6] Dorothy Richer and Gene Simmons (1974): Microcracks in crustal igneous rocks, Microscopy, Geophysical Monograph Series, The Earth' Crust, V. 20, P. 149-180.
[7] Heany, C. J., Prewitt and Gibbs, G.V. (1994): Silica – physical behaviour , geochemistry and materials applications. Mineralogical Society of America, V. 29, PP. 606.
[8] Jadhav, G.N., Panchapakerson , V. and Sahu, K.C.(1993): The role of fluid inclusions in mineral exploration- An attempt on the Bihar Mica Belt of India . J. Nonrenewable Resources, V2, Issue 2, P.156-166.
[9] Kirsti Midttomme and Elen Roaldset (1998): The effect of grain size on thermal conductivity of quartz sands and silts. J. Petroleum Geosciences, V. 4, Issue 2, P. 165-172.
[10] Koster Van , A.F. , Groos & Ter Heege (1973) : High pressure differential analysis in the system CaO-CO2-H2O. American Mineralogist, V.67, P. 234-237.
[11] Noni, A., Hotza , D . Soler, D, Sanchez Vilches ,V. E. (2009): Effect of quartz particle size on the mechanical behaviour of porcelain tile subjected to different cooling rates. J. Eur. Ceram. Soc., V. 29, N.6, P.1039-1046.
[12] Raymond F. Walker, Samuel Zerfoss, Sylvanus, F., Holley and Liley J.,Gross (1958): Temperature of the Inversion in Cristobalite. Journal of Research of the National Bureau of Standards, V. 61, N.4, Research Paper 290.
[13] Sandford , S. Cole (1935): The conversion of quartz into cristobalite below 1000°c, and some properties of the cristobalite formed . Journal of the American Ceramic Society, V.18, Issue 1-12, P. 149–154.
[14] Signorini, E.(1991): Influence of the fine grinding of hard materials on porcelain and vitreous tableware . Industrial Ceramics, N. 858, P. 174–179.

[15] Simon, K.(2001): Does δ D from fluid inclusion in quartz reflect the original hydrothermal fluid ? . Chemical Geology, V. 177, Issues 3– 4, P. 483-495.
[16] Susan, L., Brantley, Brian Evans, Stephen, H., Hickman David, A. and Crerar (1990): Healing of microcrackes in quartz: Implication of fluid flow. Geology printed in U.S.A., V.2 N. 2, P. 136—139.
[17] Thomas, R., Webster, J. D., Heinrie, W. (2000): Melt inclusions in pegmatite quartz: Complete miscibility between silicate melts and hydrous fluids at low temperature .Contrib. Mineral Petrol. N. 139: 394-401.

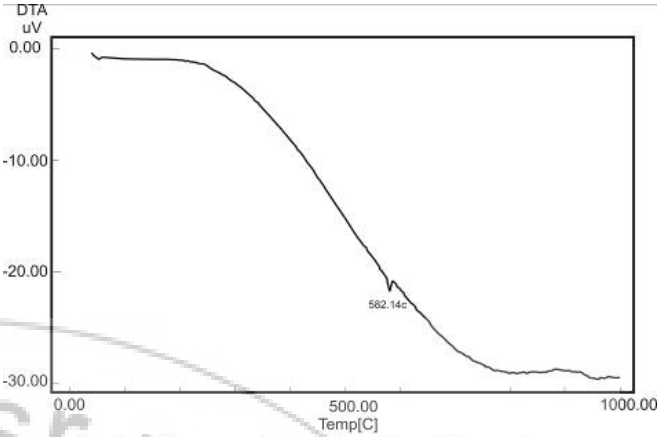

Fig. 4: DTA curve of pegmatite milky white quartz (heating rate 10 °C/min, particle size 0.1mm).

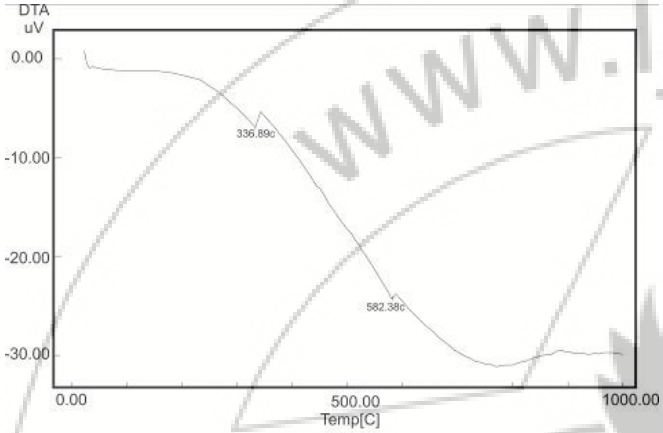

Fig. 2: DTA curve of hydrothermal translucent prismatic quartz, (heating rate 10 °C/min, particle size 0.1mm)

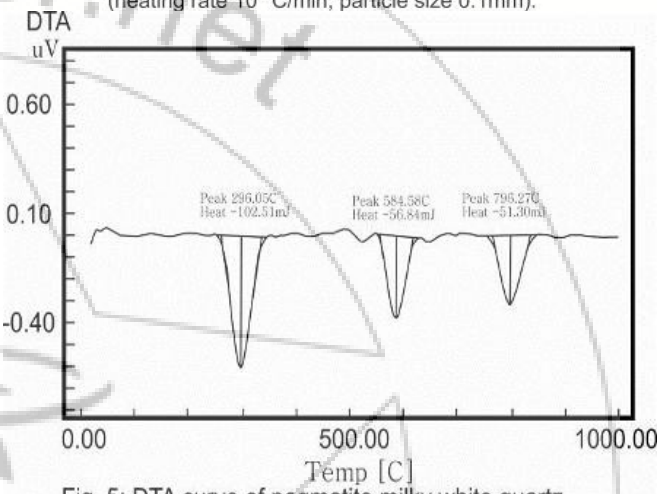

Fig. 5: DTA curve of pegmatite milky white quartz (heating rate 15 °C/min, particle size 0.1mm).

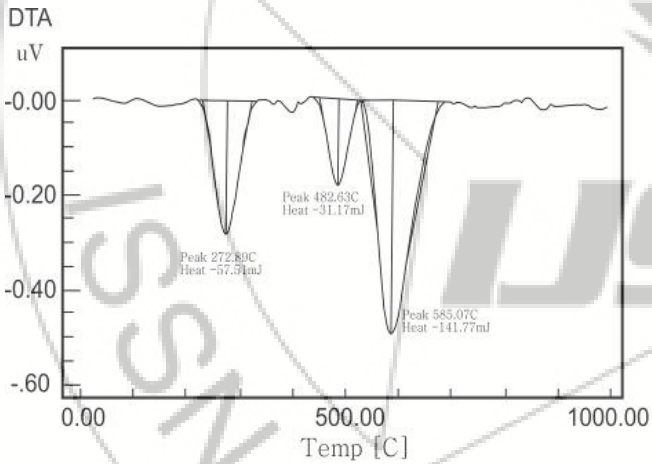

Fig. 3: DAT curve of hydrothermal translucent prismatic quartz, (heating rate 15 °C/min, particle size 0.1mm)

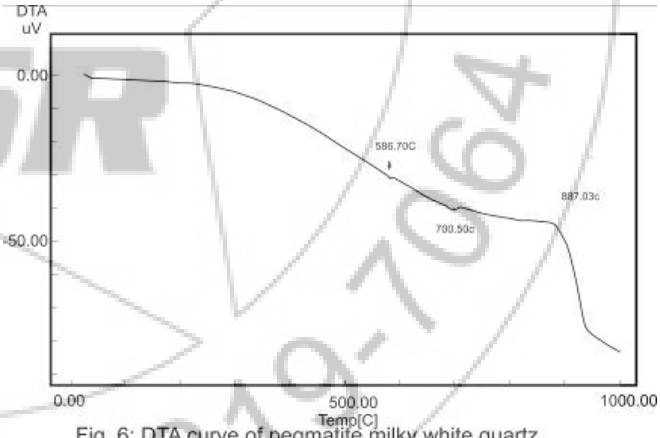

Fig. 6: DTA curve of pegmatite milky white quartz (heating rate 10 °C/min, particle size 1.0 mm).

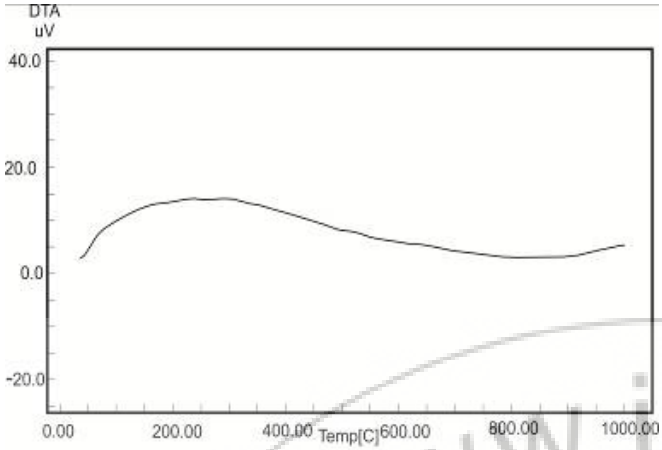

Fig. 7: DTA curve of pegmatite milky white quartz, (heating rate 10 °C/min, particle size 0.05mm)