

CHAPTER- 9

(Comparatively study of of Spinel,
ZrO₂ - Spinel , Porous Spinel Porous
ZrO₂ - Spinel)

9.1 Comparatively study of Bulk Density and Apparent Porosity SP,PSP,ZSP PZSP

The bulk density is maximum for ZSP as comparison to SP,PSP,PZSP where as porosity is minimum

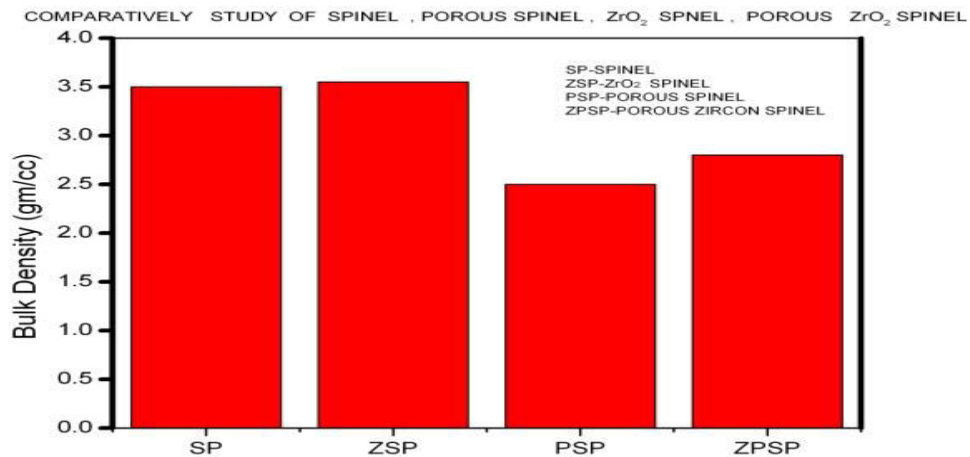


Figure 9.1.1 Comparatively BD of SP,ZSP,PSP,ZPSP

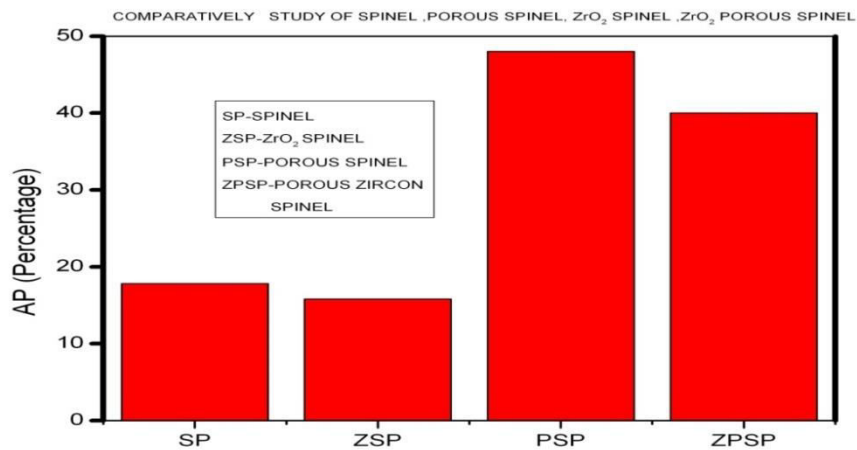


Figure 9.1.2 Comparatively AP of SP,ZSP,PSP,ZPSP

9.2 Corrosion Action

Corrosion are maximum for SP where as Minimum for ZPSP for different acid and bath solution treatment . [Grzelczak ,(2013)].

Table 9.2.1 corrosion for different bath

BATH	SP	ZSP	PSP	ZPSP
HCL	2.85	2.83	2.81	2.71
NAOH	1.83	1.81	1.77	1.75

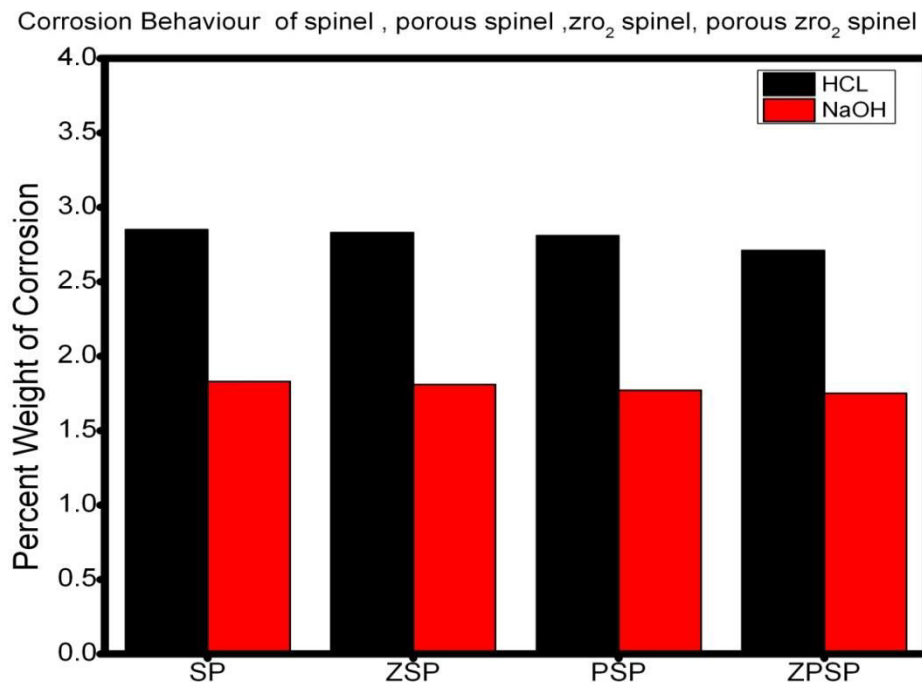


Figure 9.2 Corrosion behavior of SP,ZSP.PSP.ZPSP

9.3 Thermal Behaviour

From the figure 9.3.1 It seen that Derivative of thermal pulse are continous rising curve as comparison to different solution treatment .PMSO show low derivative as comparison to all.

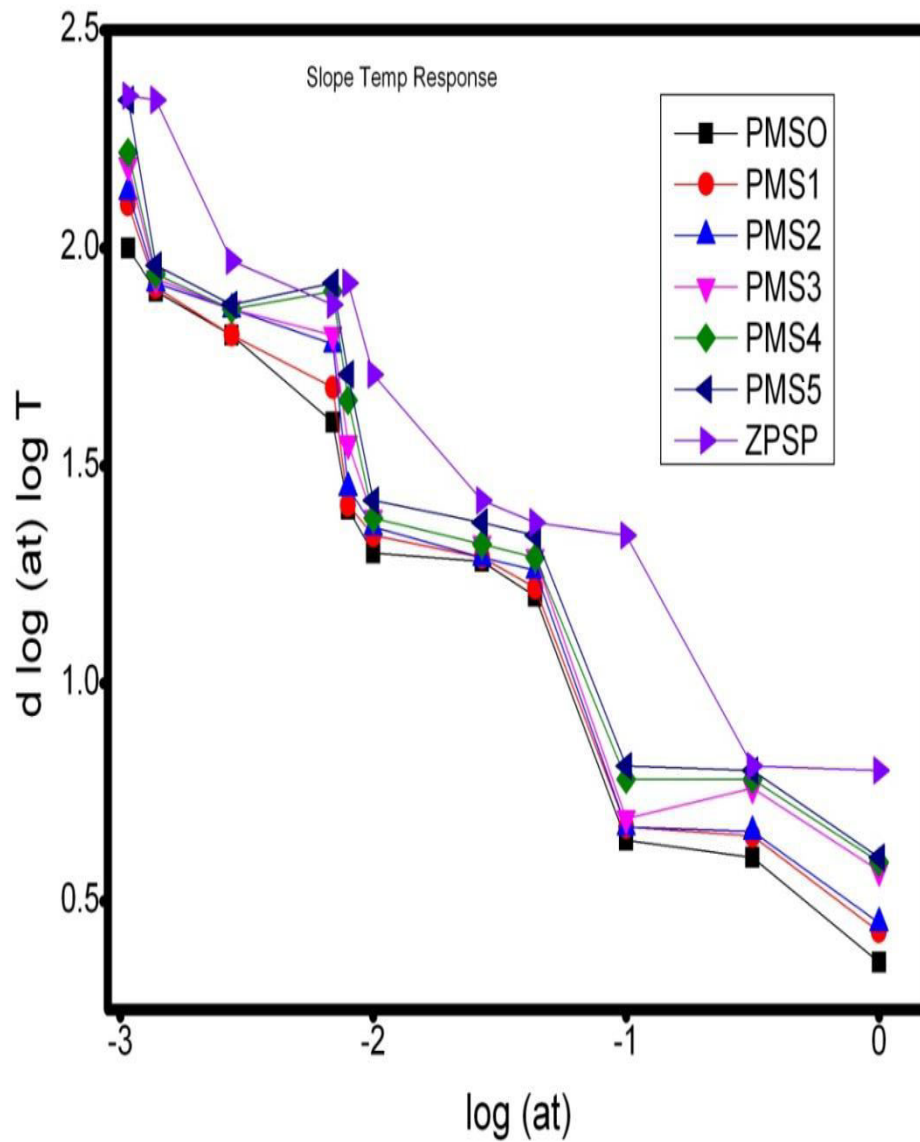


Figure 9.3.1 Derivative Behavior of Dirac Thermal Pulse SP,ZSP.PSP.ZPSP

From the figure 9.3.2 gives idea about Dilatometry study of SP,PSP ZSP ,PZSP it has been seen that co efficient of thermal expansion becomes constant at temperature greater than 600 °C ZSP has maximum co-efficient of thermal expansion.

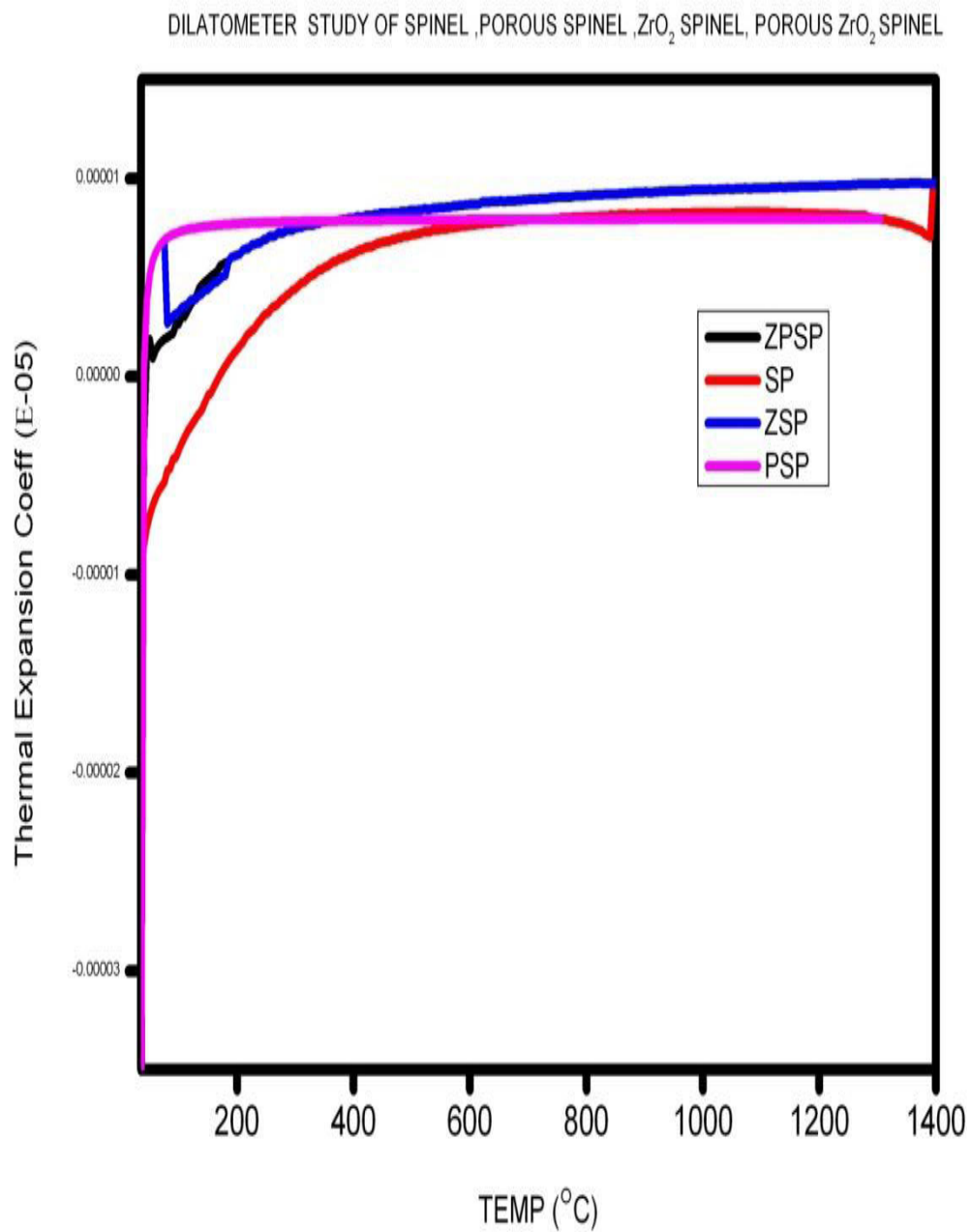


Figure 9.3.2 Co-eff of Thermal expansion of SP,ZSP.PSP.ZPSP

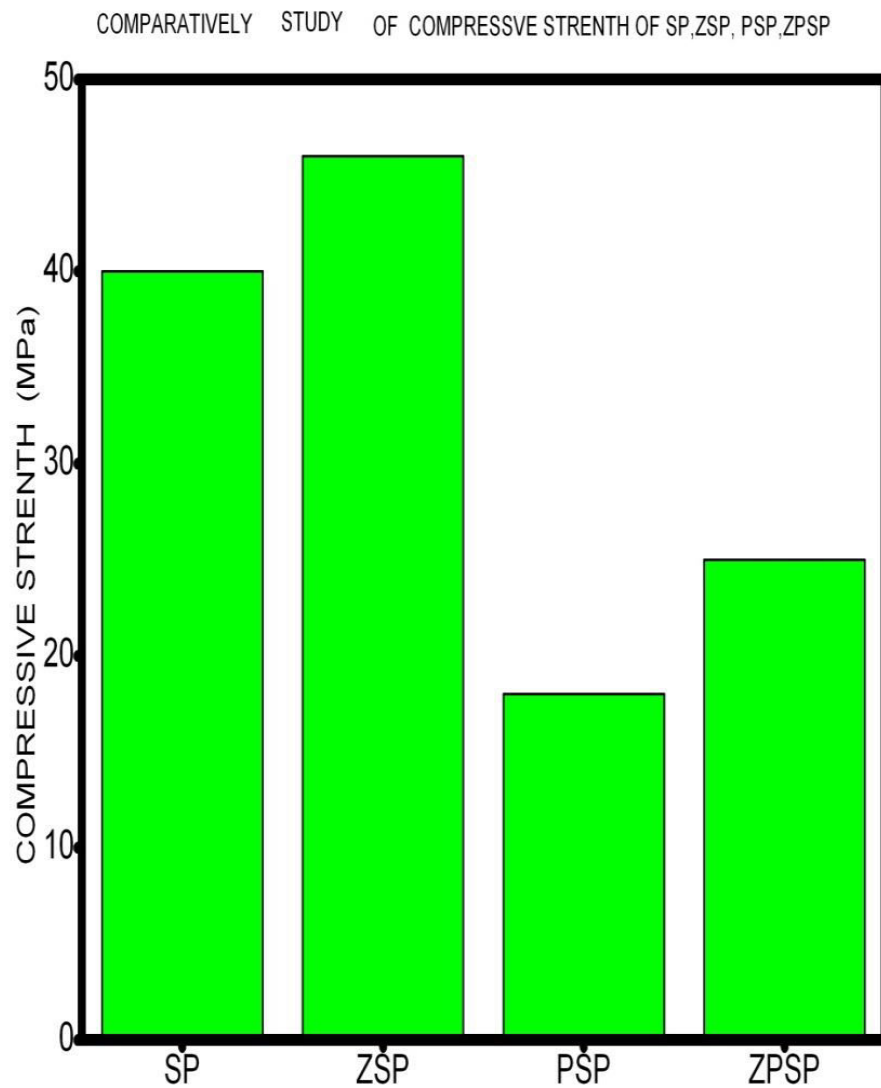


Figure 9.3.3 Comparatively study of compressive strength of SP,ZSP.PSP.ZPSP

From the figure 9.3.3 it is seen that ZSP has maximum compressive strength due to addition of zirconia in a material composite .PSP has compressive strength minimum as comparison to SP ,PSP ZSP ZPSP Materials.

From the figure 9.3.4 and 9.3.5 shows a Compressive strength are sharply decrease to several MPa at temperature are between 1400 to 1420 °C This is due to thermal shock in a material or tension present in amaterial [Tian *et al*,2009].

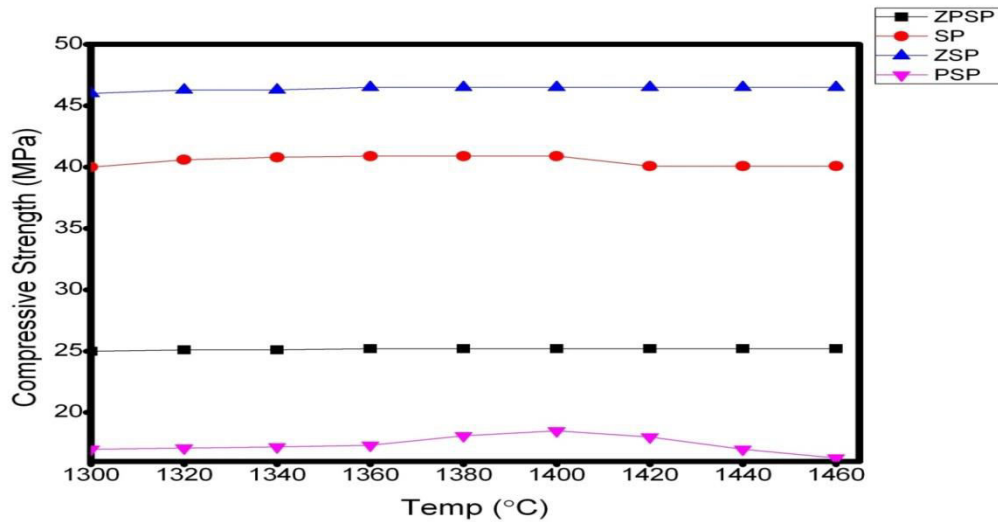


Figure 9.3.4 Measurement of Thermal shock by Compressive strength in SP ,PSP,ZSP ZPSP

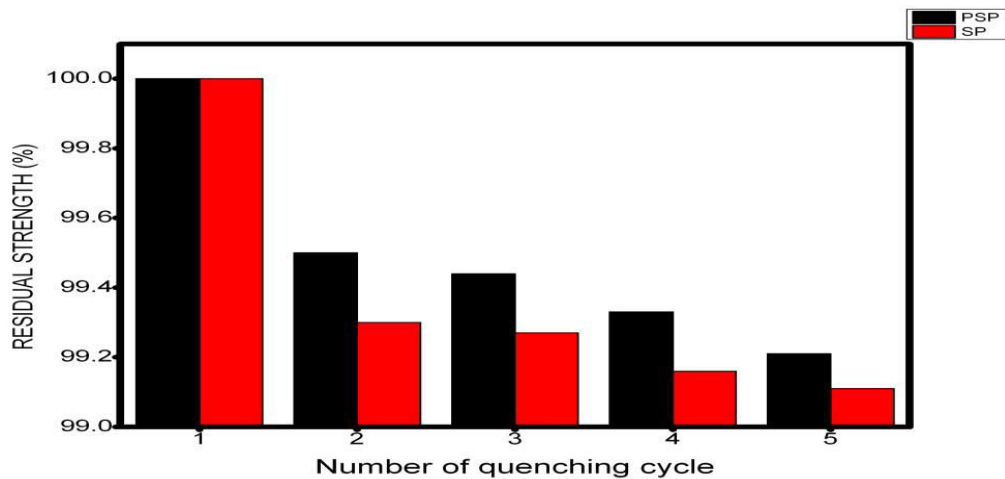


Figure 9.3.5 Residual strength for different cycle

The below diagram of Figure 9.3.6 shows Compressive strength for different shoaking period or different quenching cycle status. Spinel has a maximum quenching cycle rate as compaisan to others.

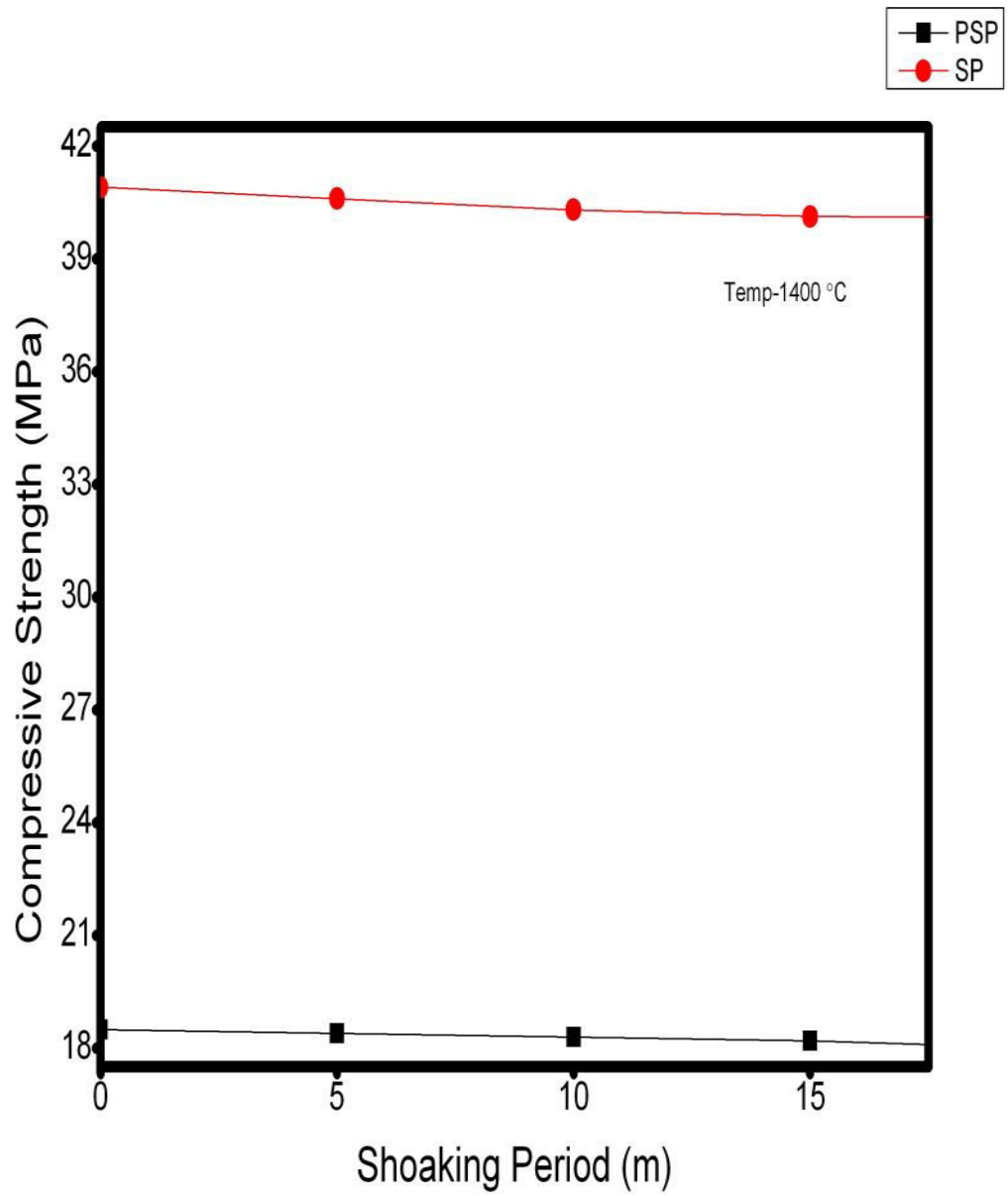


Figure 9.3.6 Compressive strength strength for different shoaking period

9.4 Failure probability

An appraisal of Failure probability is done for different material PSP has maximum failure probability in terms of finding the thermal shock in a material. A minimum probability occurs in case of SP. From the figure 9.4 It is clear that upper limit shatter downward probability are transpire for thermal shock measurement.

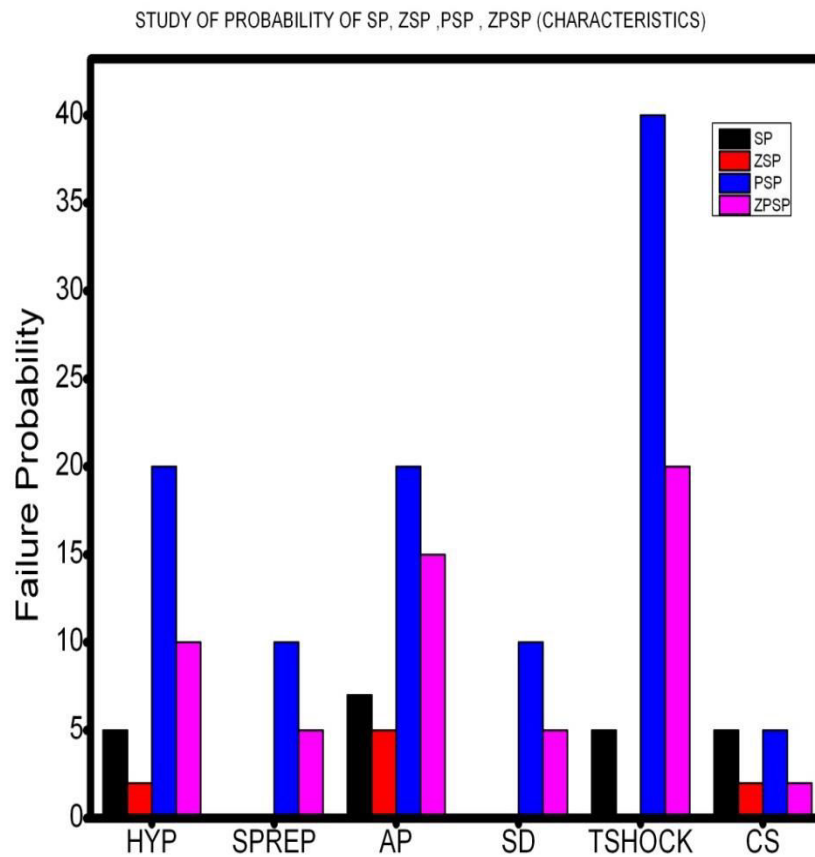


Figure 9.4 failure probability for different measurement cycle