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Perturbed Angular Correlation Study of $ZrSiO_4$ and $HfSiO_4$ HERBERT JAEGER, Miami University, SEAN MCBRIDE, Kansas State University — Time-differential perturbed angular correlation spectroscopy is a powerful technique to study short-range interactions between probe nuclei and host crystals. The technique requires a very low concentration of radioactive probe nuclei and relies on the probes substituting for atoms of the host crystal. We report on PAC measurements of synthetic zircon and hafnon using ^{181}Ta-probes to study the EFG at Zr and Hf lattice-sites. The quadrupole coupling constants for both zircon and hafnon decrease linearly with increasing temperature. The slope of ν_Q vs. T increases above 800°C (zircon) and 1100°C (hafnon) as a consequence of a change in the Zr-O and Hf-O coordination. We also observe a systematic reduction of the anisotropy value $|A_2|$ that is correlated with the onset of the structural change. Changes in the anisotropy are usually related to dynamic interaction and can be due to nuclear decay after effects. In our case we believe that we see evidence of a trapped electronic defect, giving rise to a rapidly decaying high-frequency quadrupole interaction. At higher temperatures the defect detraps and no longer causes a reduction in the anisotropy.

Herbert Jaeger
Miami University

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