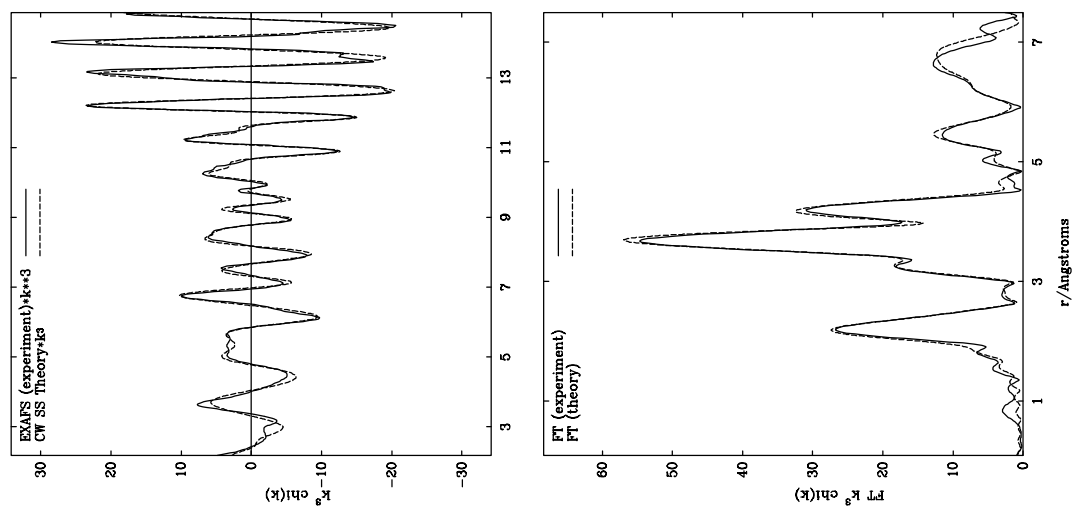


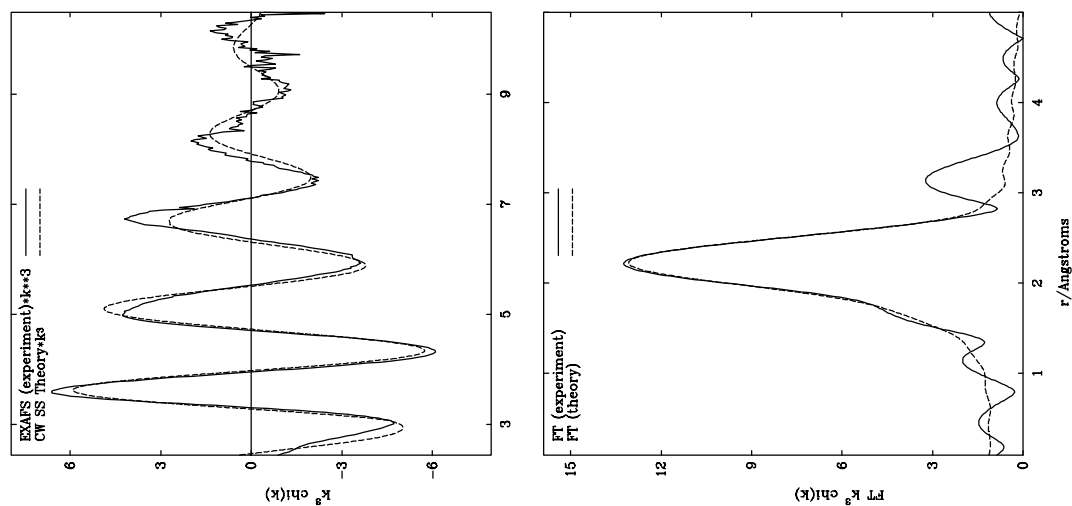
## Supplementary material

Er L<sub>III</sub>-edge  $k^3$ -weighted EXAFS spectra and Fourier transforms, phase-shift corrected for oxygen (—, experimental; - - - - -, curved wave theory)

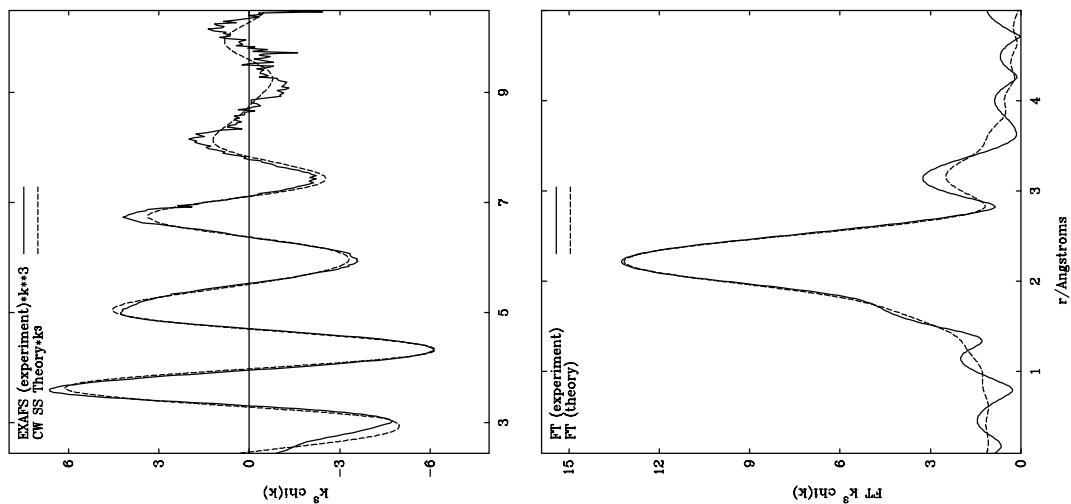
(a) Er<sub>2</sub>O<sub>3</sub> (50 K)



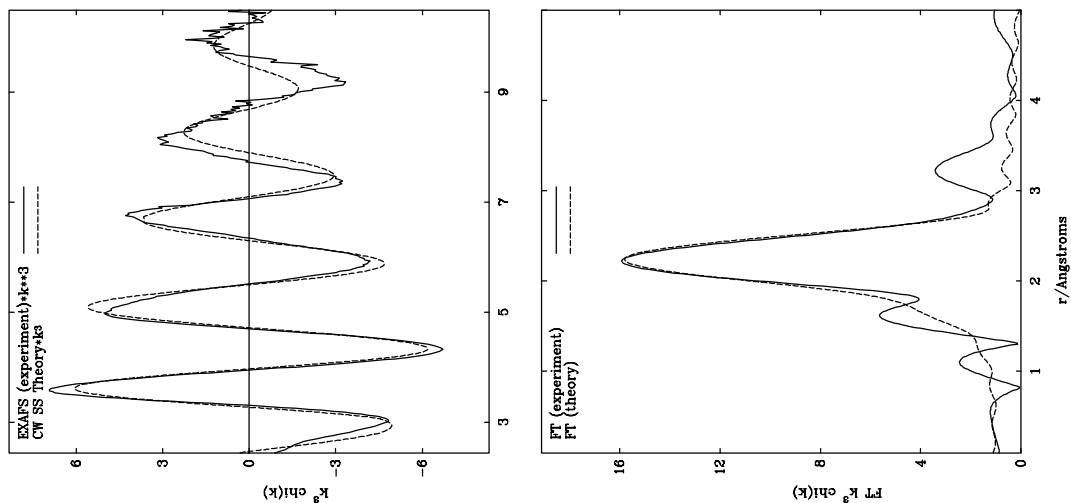
(b) Er<sup>3+</sup>-exchanged ETS-10 (higher erbium loading, 298 K, fit A in Table 1)



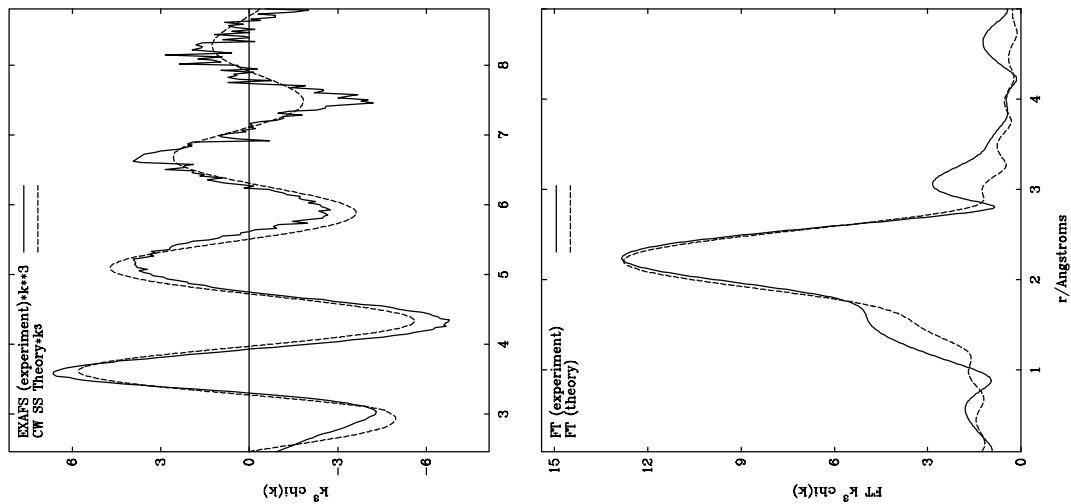
(c)  $\text{Er}^{3+}$ -exchanged ETS-10 (higher erbium loading, 298 K, fit B in Table 1)



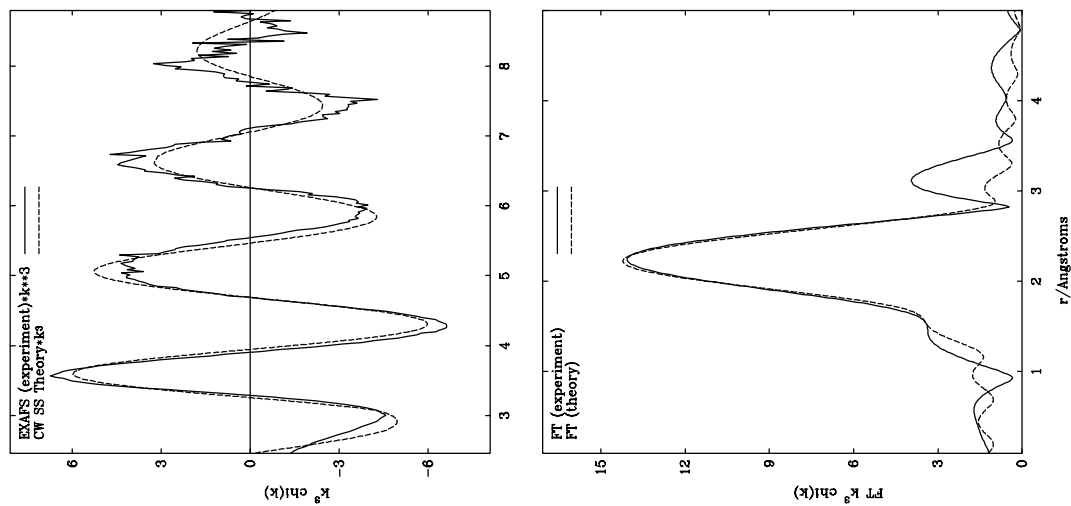
(d)  $\text{Er}^{3+}$ -exchanged ETS-10 (higher erbium loading, 50 K, fit A in Table 1)



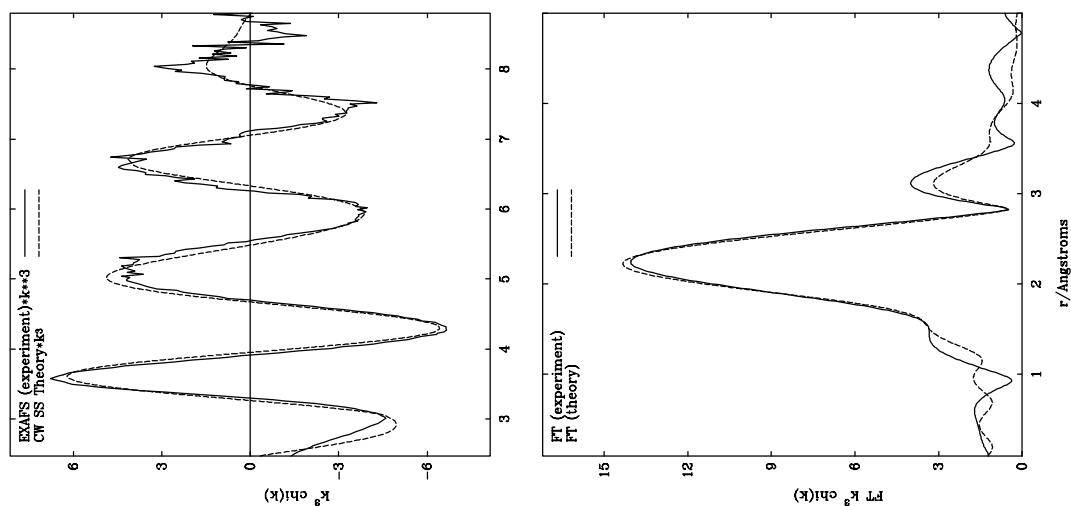
(e)  $\text{Er}^{3+}$ -exchanged ETS-10 (lower erbium loading, 298 K, fit A in Table 1)



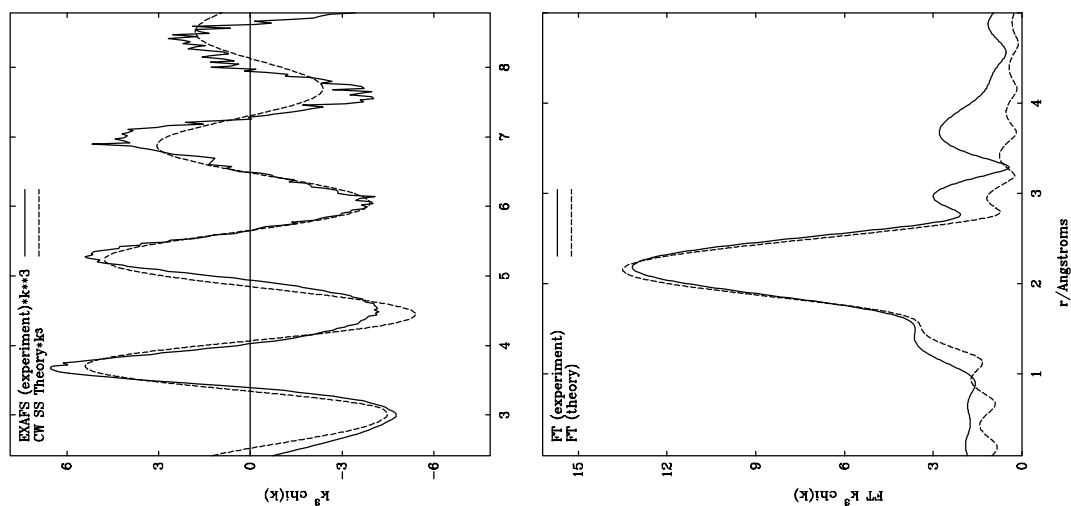
(f)  $\text{Er}^{3+}$ -exchanged ETS-10 (lower erbium loading, 50 K, fit A in Table 1)



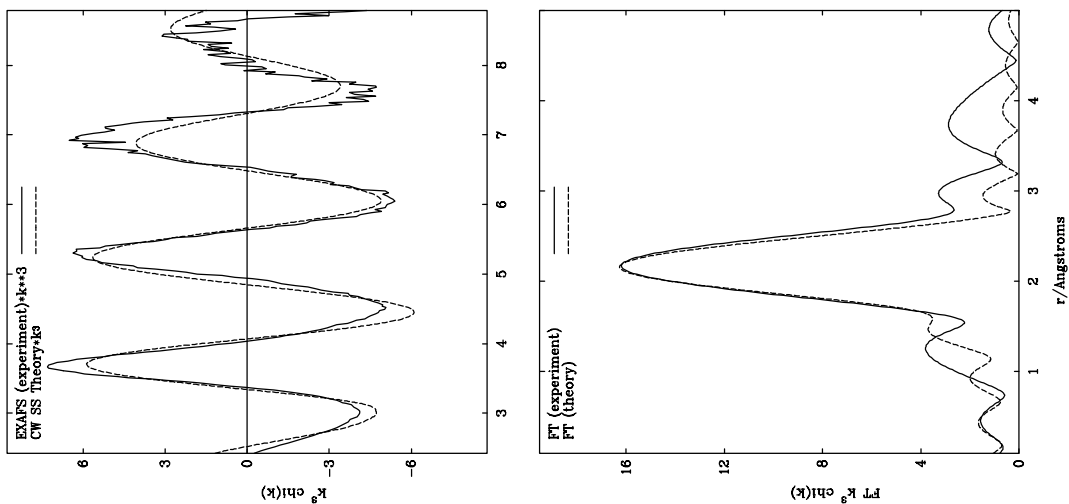
(g)  $\text{Er}^{3+}$ -exchanged ETS-10 (lower erbium loading, 50 K, fit B in Table 1)



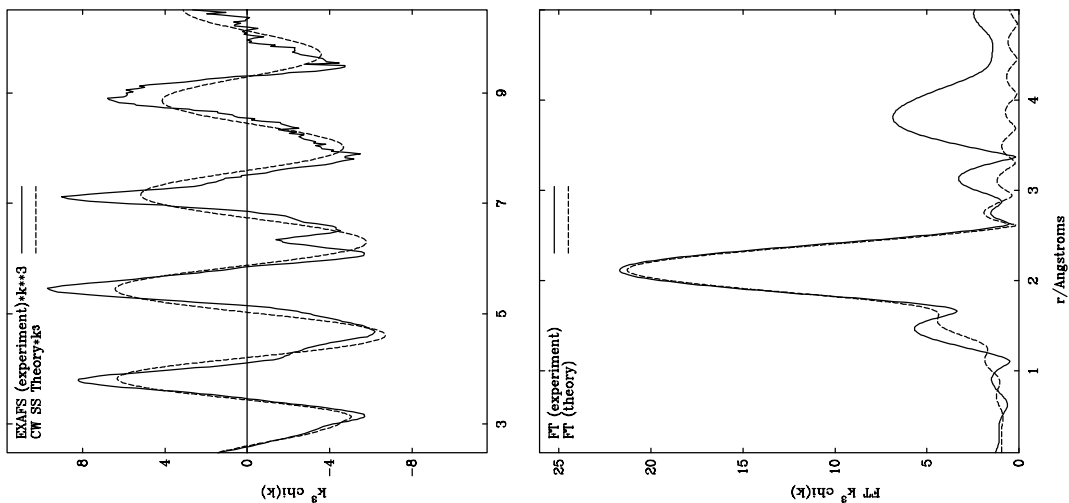
(h)  $\text{Er}^{3+}$ -exchanged ETS-10 (lower erbium loading) calcined at 973 K (298 K, fit A in Table 2)



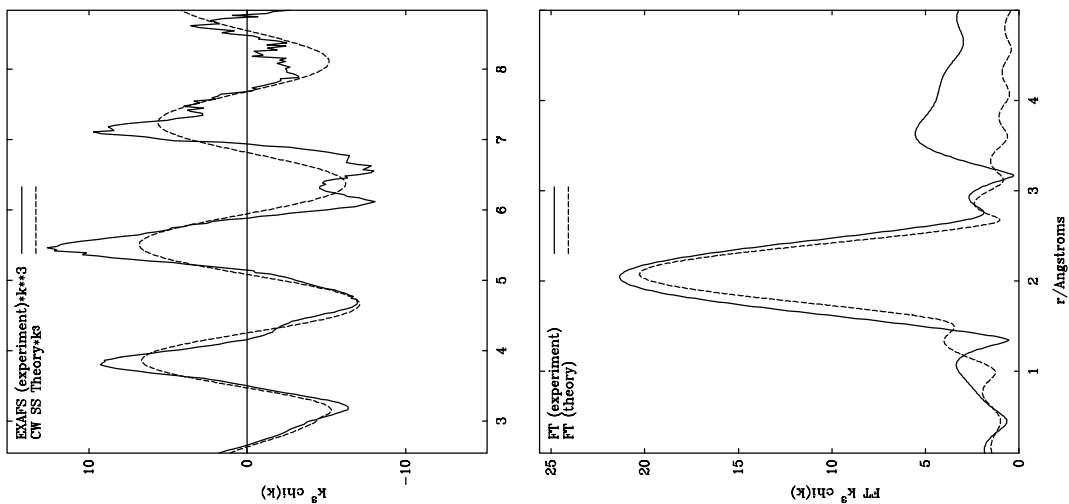
(i)  $\text{Er}^{3+}$ -exchanged ETS-10 (lower erbium loading) calcined at 973 K (50 K, fit A in Table 2)



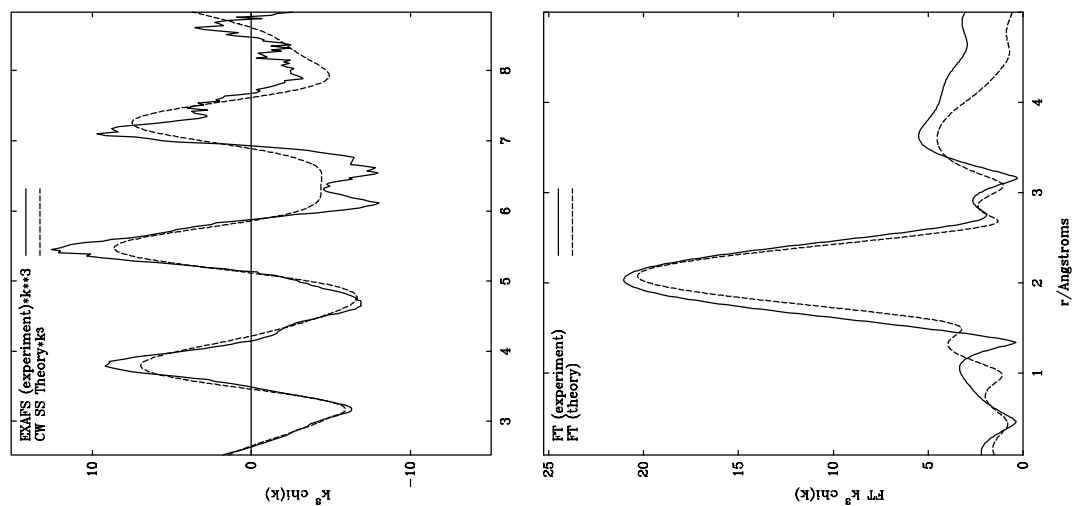
(j)  $\text{Er}^{3+}$ -exchanged ETS-10 (higher erbium loading) calcined at 1073 K (50 K, fit A in Table 2)



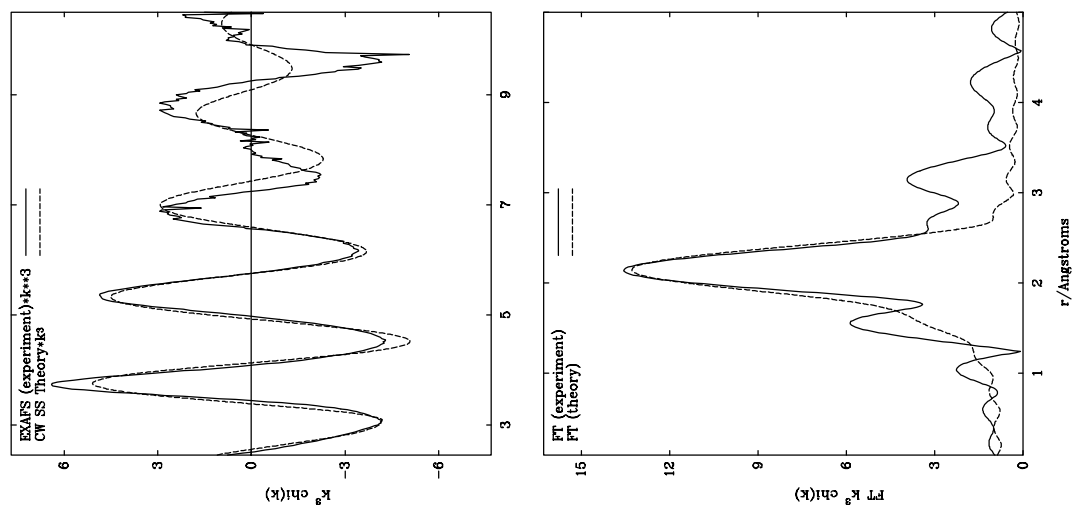
(k)  $\text{Er}^{3+}$ -exchanged ETS-10 (lower erbium loading) calcined at 1073 K (50 K, fit A in Table 2)



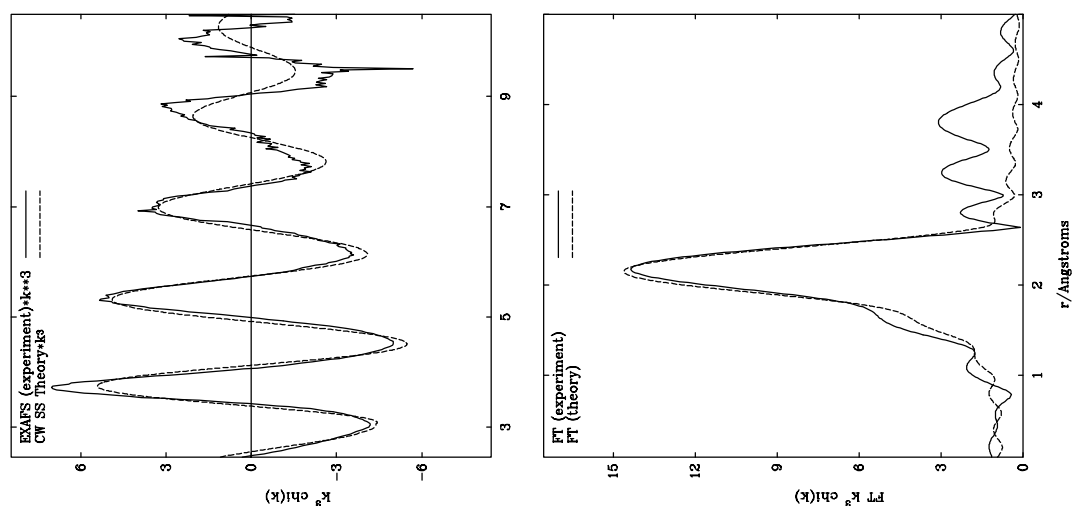
(l)  $\text{Er}^{3+}$ -exchanged ETS-10 (lower erbium loading) calcined at 1073 K (50 K, fit B in Table 2)



(m)  $\text{Er}^{3+}$ -exchanged ETS-10 (higher erbium loading) calcined at 1473 K (298 K, fit A in Table 2)



(n)  $\text{Er}^{3+}$ -exchanged ETS-10 (higher erbium loading) calcined at 1473 K (50 K, fit A in Table 2)



(o)  $\text{Er}^{3+}$ -exchanged ETS-10 (lower erbium loading) calcined at 1473 K (50 K, fit A in Table 2)

