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Prominent Metal Phase Quasi-Particle Peak and High Temperature Mott-Hubbard Gap Filling in Photoemission Spectra of $(V_{1-x}Cr_x)_2O_3$[1]

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Two new findings [1,2] have been made in photoemission spectra of the paradigm Mott-Hubbard transition system $(V_{1-x}Cr_x)_2O_3$. First [1], in the paramagnetic metal phase of V_2O_3 there is a prominent quasi-particle peak at the Fermi energy, of amplitude larger than the rest of the V 3d spectrum by a factor approaching two. The peak is qualitatively much like that found in spectral calculations that combine dynamic mean field theory (DMFT) and band theory in the local density approximation (LDA), but shows important differences quantitatively. Second [2], in the paramagnetic insulating phase of $(V_{0.972}Cr_{0.028})_2O_3$, spectra taken in ultra high vacuum up to the unusually high temperature (T) of 800K reveal a property unique to the Mott-Hubbard insulator. With increasing T the MH gap is filled by spectral weight transfer, in qualitative agreement with high-T LDA+DMFT theory. [1] S.-K. Mo *et al*, Phys. Rev. Lett. **90** 186403 (2003). [2] S.-K. Mo *et al*, Phys. Rev. Lett. **93** 076404 (2004).

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