Supporting information for: Electron-phonon coupling and hot electron thermalization in titanium nitride

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DFT results for gold and all the TiN systems considered: Au, $TiN_{0.80}O_{0.20}$, $TiN_{0.85}O_{0.15}$, $TiN_{0.90}O_{0.10}$, $TiN_{0.95}O_{0.05}$, $TiN_{1.00}$, $TiN_{0.97}$, $TiN_{0.94}$, $TiN_{0.91}$, $TiN_{0.88}$, $TiN_{0.84}$. TiN systems have been ordered with respect to the number of electrons per unit cell.

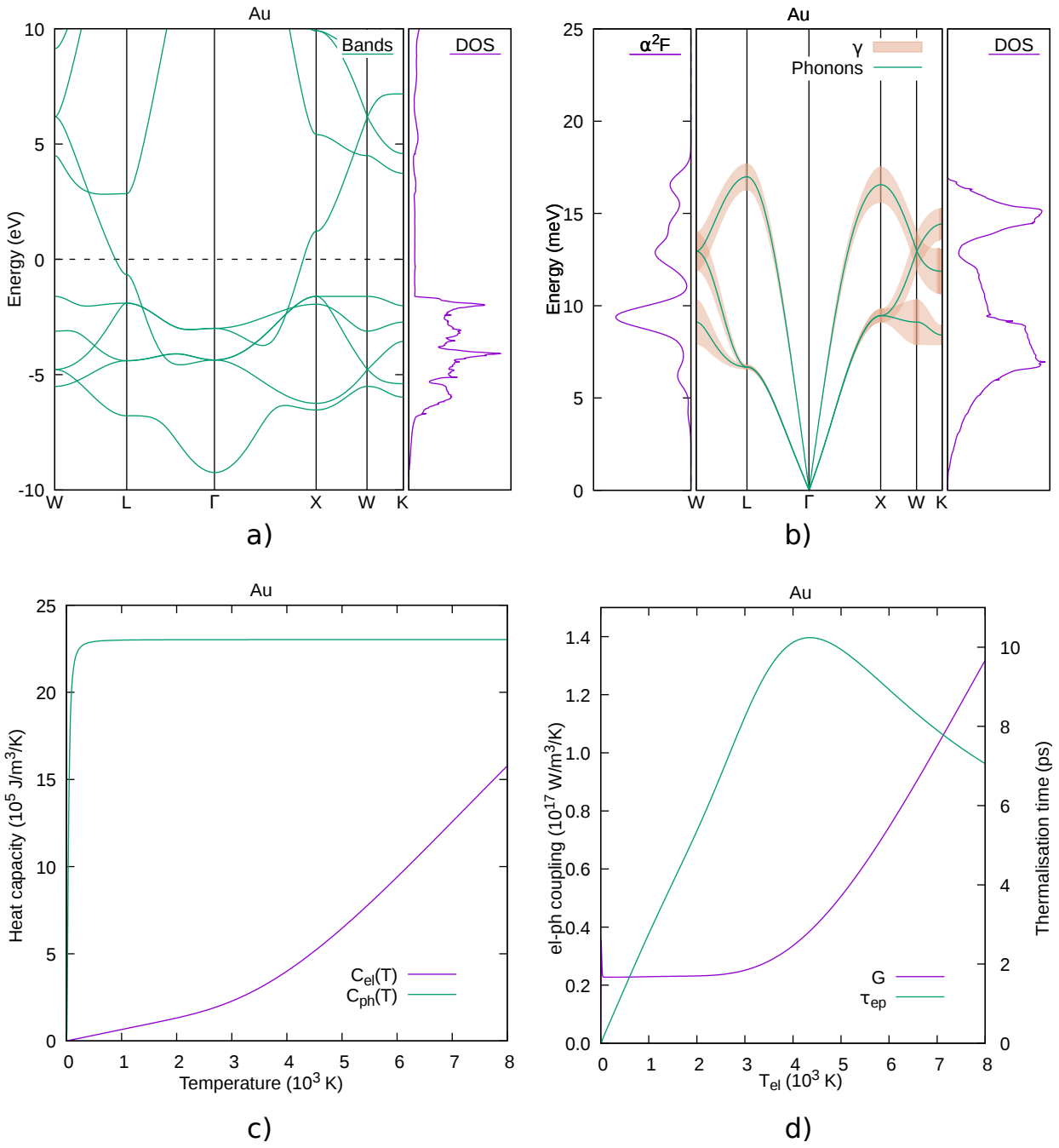

Figure S1: DFT results for Au. a) Electron band structure and DOS (DOS values in the range 0 to 5 states/eV/unitcell). b) Phonon band structure, DOS, phonon linewidths (magnification $\times 200$) and Eliashberg function (DOS and α^2F in the range 0 to 0.06 states/eV/unitcell and 0 to 0.3, respectively). c) Electron and phonon heat capacities. d) Electron-phonon coupling parameter and hot electron thermalisation time.

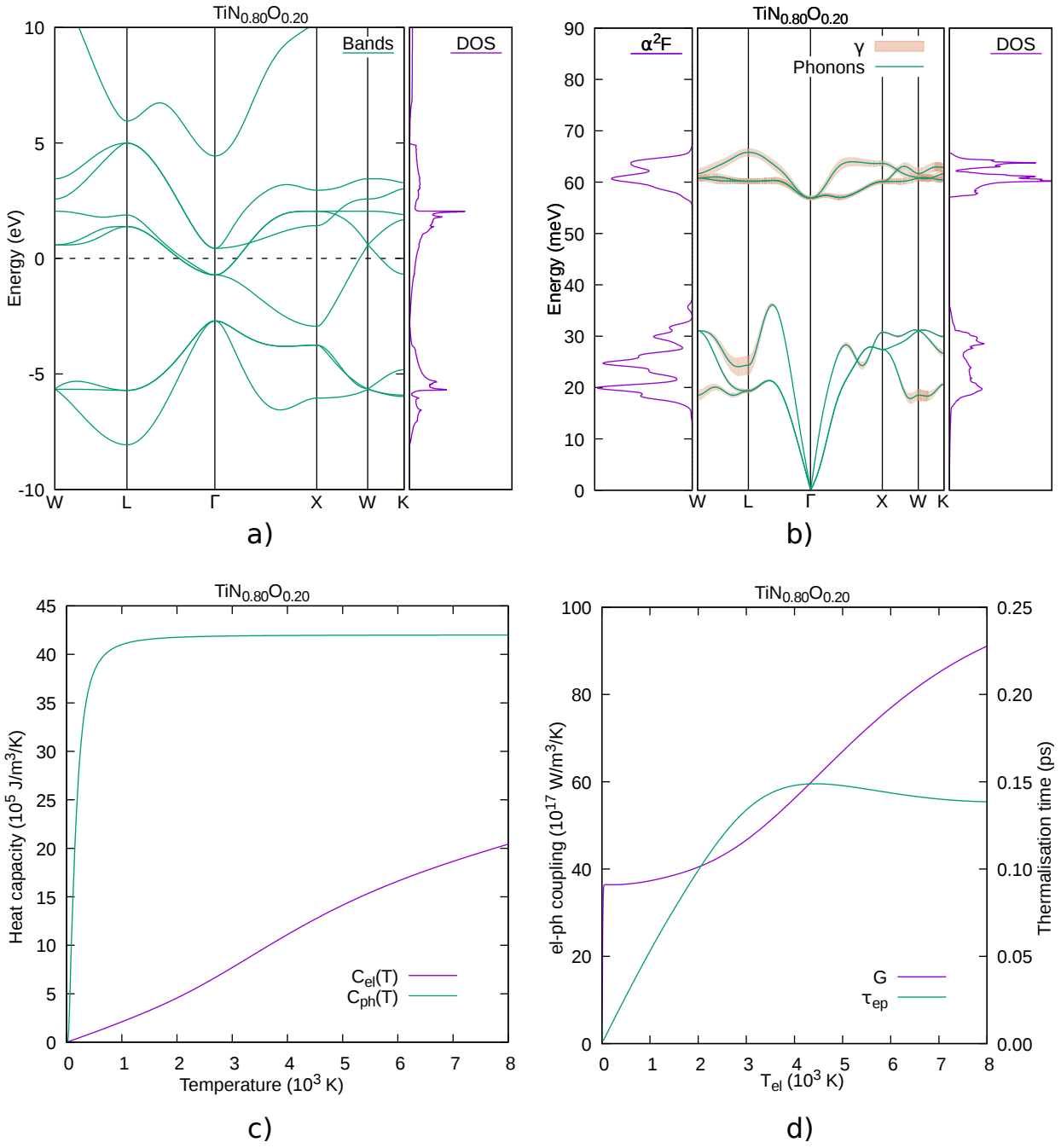

Figure S2: DFT results for $TiN_{0.80}O_{0.20}$. a) Electron band structure and DOS (DOS values in the range 0 to 16 states/eV/unitcell). b) Phonon band structure, DOS, phonon linewidths (magnification $\times 2$) and Eliashberg function (DOS and α^2F in the range 0 to 0.12 states/eV/unitcell and 0 to 1.3, respectively). c) Electron and phonon heat capacities. d) Electron-phonon coupling parameter and hot electron thermalisation time.

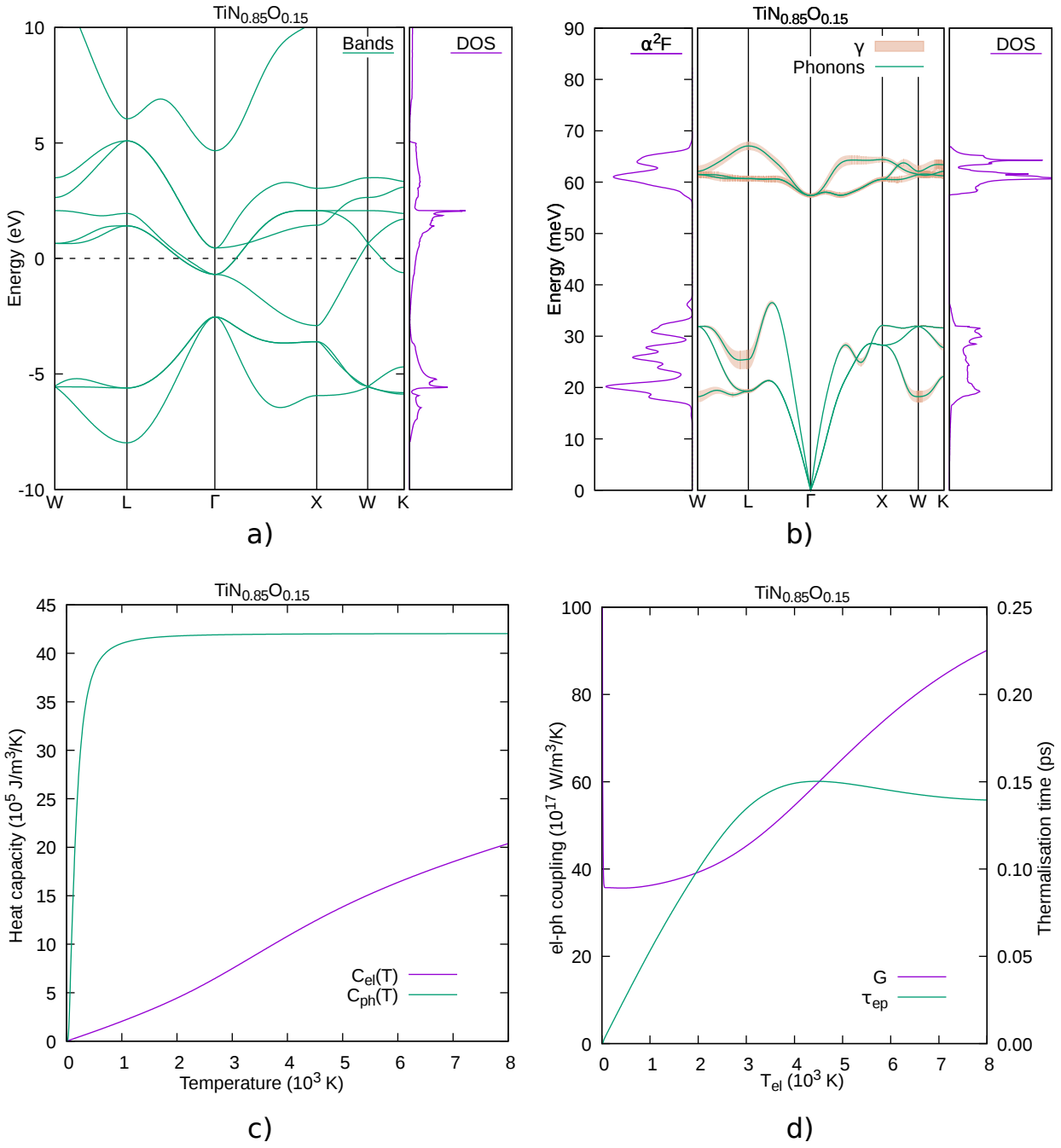

Figure S3: DFT results for $TiN_{0.85}O_{0.15}$. a) Electron band structure and DOS (DOS values in the range 0 to 16 states/eV/unitcell). b) Phonon band structure, DOS, phonon linewidths (magnification ×2) and Eliashberg function (DOS and α^2F in the range 0 to 0.12 states/eV/unitcell and 0 to 1.3, respectively). c) Electron and phonon heat capacities. d) Electron-phonon coupling parameter and hot electron thermalisation time.

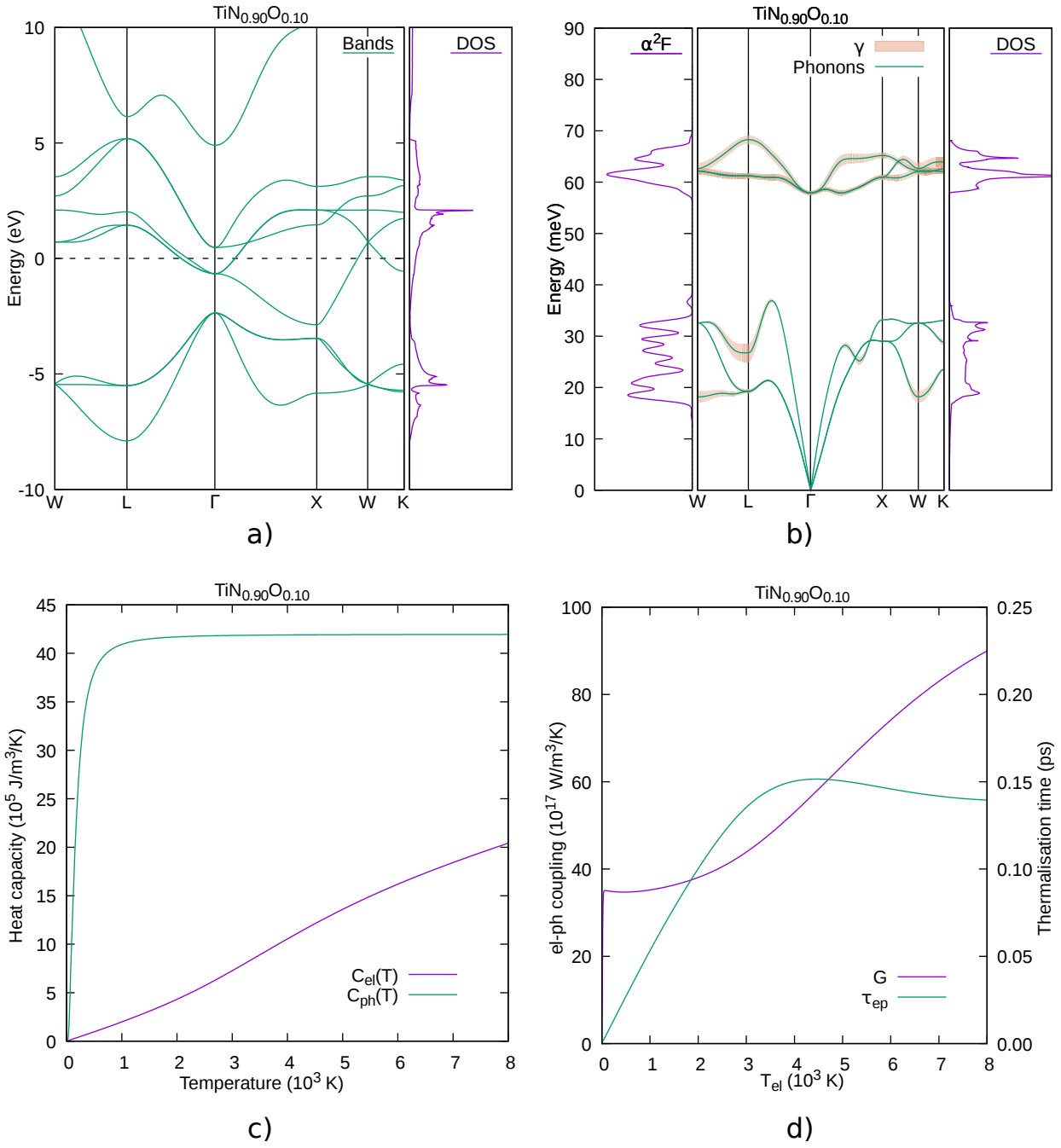

Figure S4: DFT results for $TiN_{0.90}O_{0.10}$. a) Electron band structure and DOS (DOS values in the range 0 to 16 states/eV/unitcell). b) Phonon band structure, DOS, phonon linewidths (magnification ×2) and Eliashberg function (DOS and α^2F in the range 0 to 0.12 states/eV/unitcell and 0 to 1.3, respectively). c) Electron and phonon heat capacities. d) Electron-phonon coupling parameter and hot electron thermalisation time.

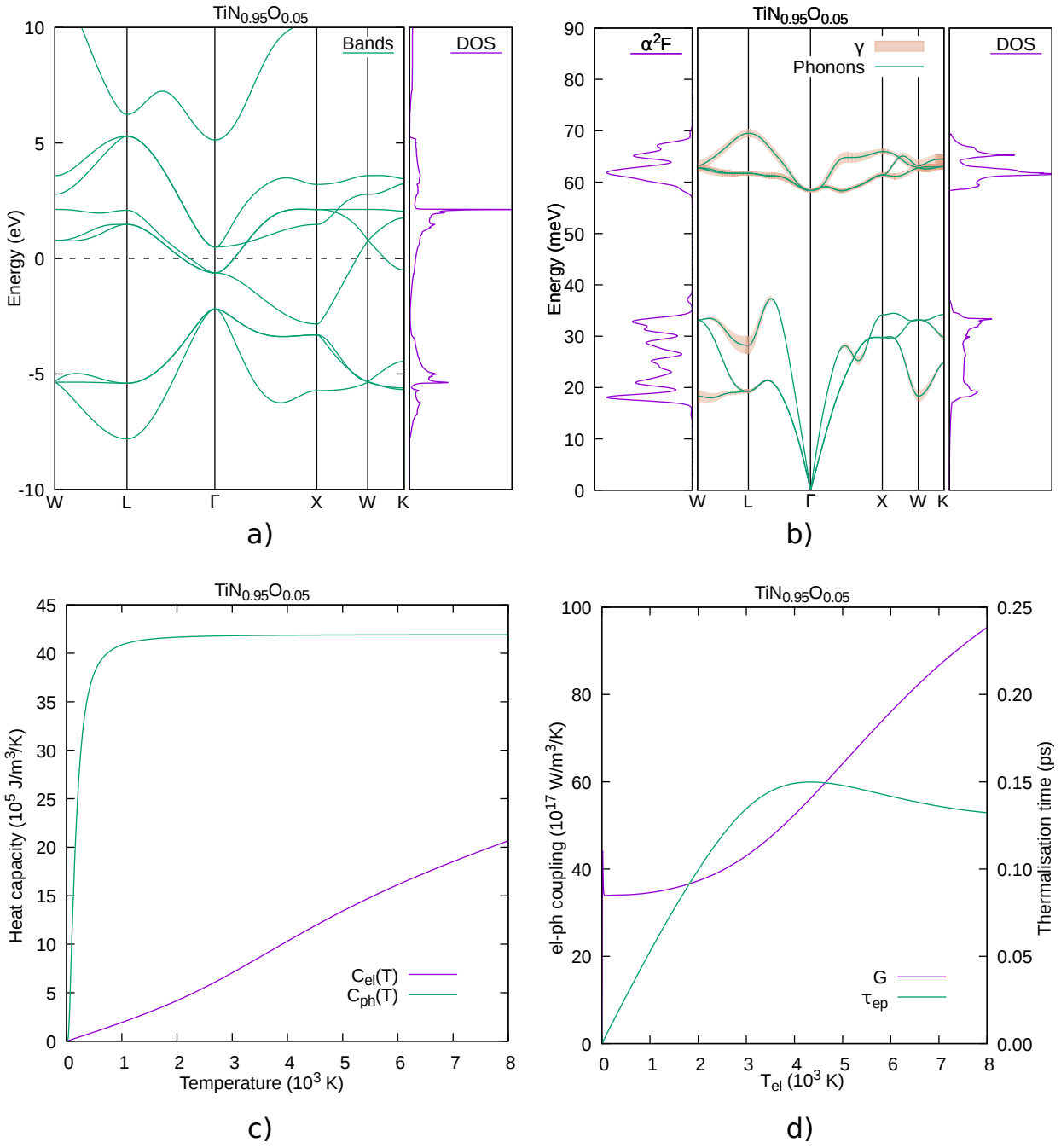

Figure S5: DFT results for $TiN_{0.95}O_{0.05}$. a) Electron band structure and DOS (DOS values in the range 0 to 16 states/eV/unitcell). b) Phonon band structure, DOS, phonon linewidths (magnification ×2) and Eliashberg function (DOS and α^2F in the range 0 to 0.12 states/eV/unitcell and 0 to 1.3, respectively). c) Electron and phonon heat capacities. d) Electron-phonon coupling parameter and hot electron thermalisation time.

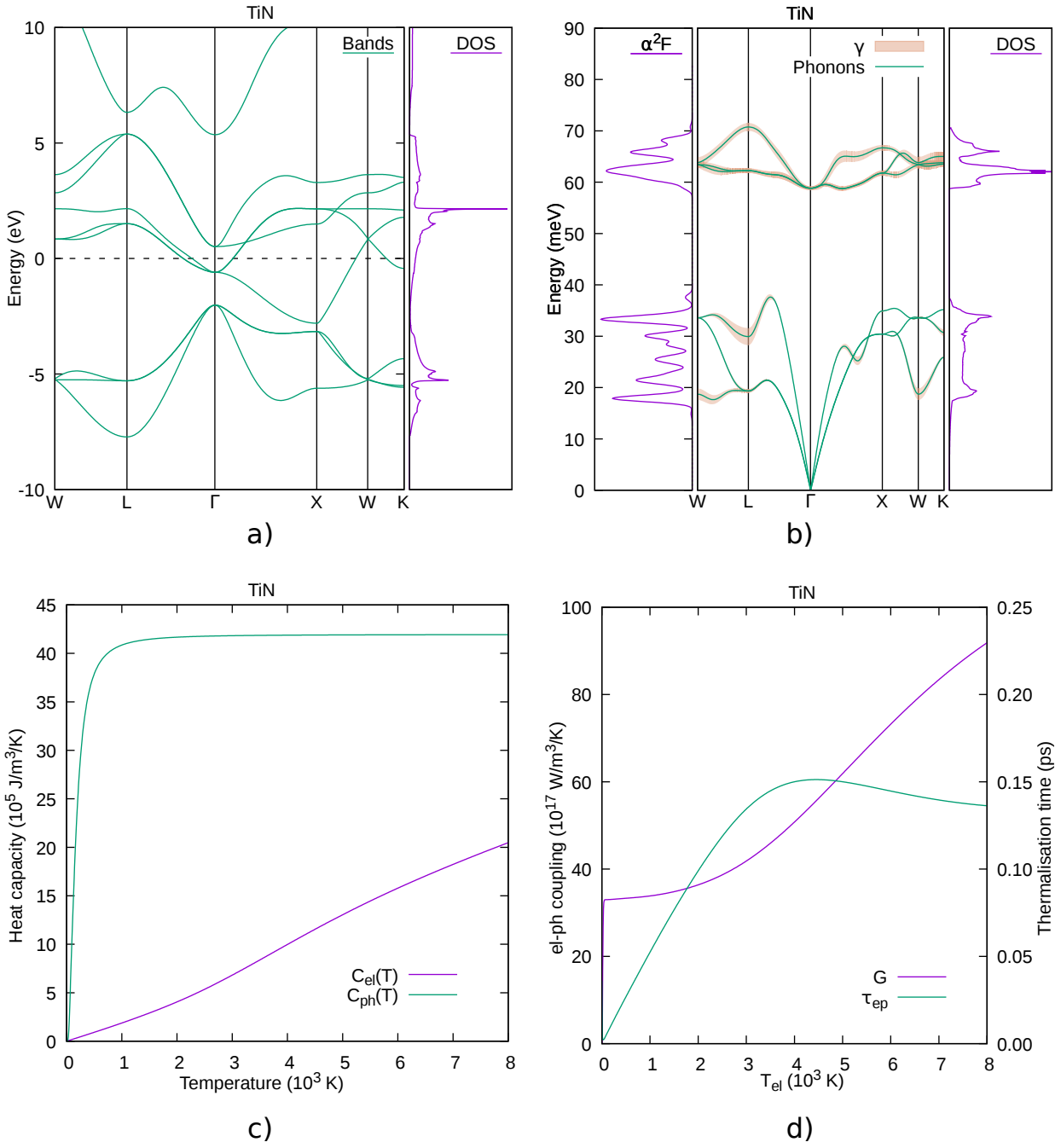

Figure S6: DFT results for TiN. a) Electron band structure and DOS (DOS values in the range 0 to 16 states/eV/unitcell). b) Phonon band structure, DOS, phonon linewidths (magnification ×2) and Eliashberg function (DOS and α^2F in the range 0 to 0.12 states/eV/unitcell and 0 to 1.3, respectively). c) Electron and phonon heat capacities. d) Electron-phonon coupling parameter and hot electron thermalisation time.

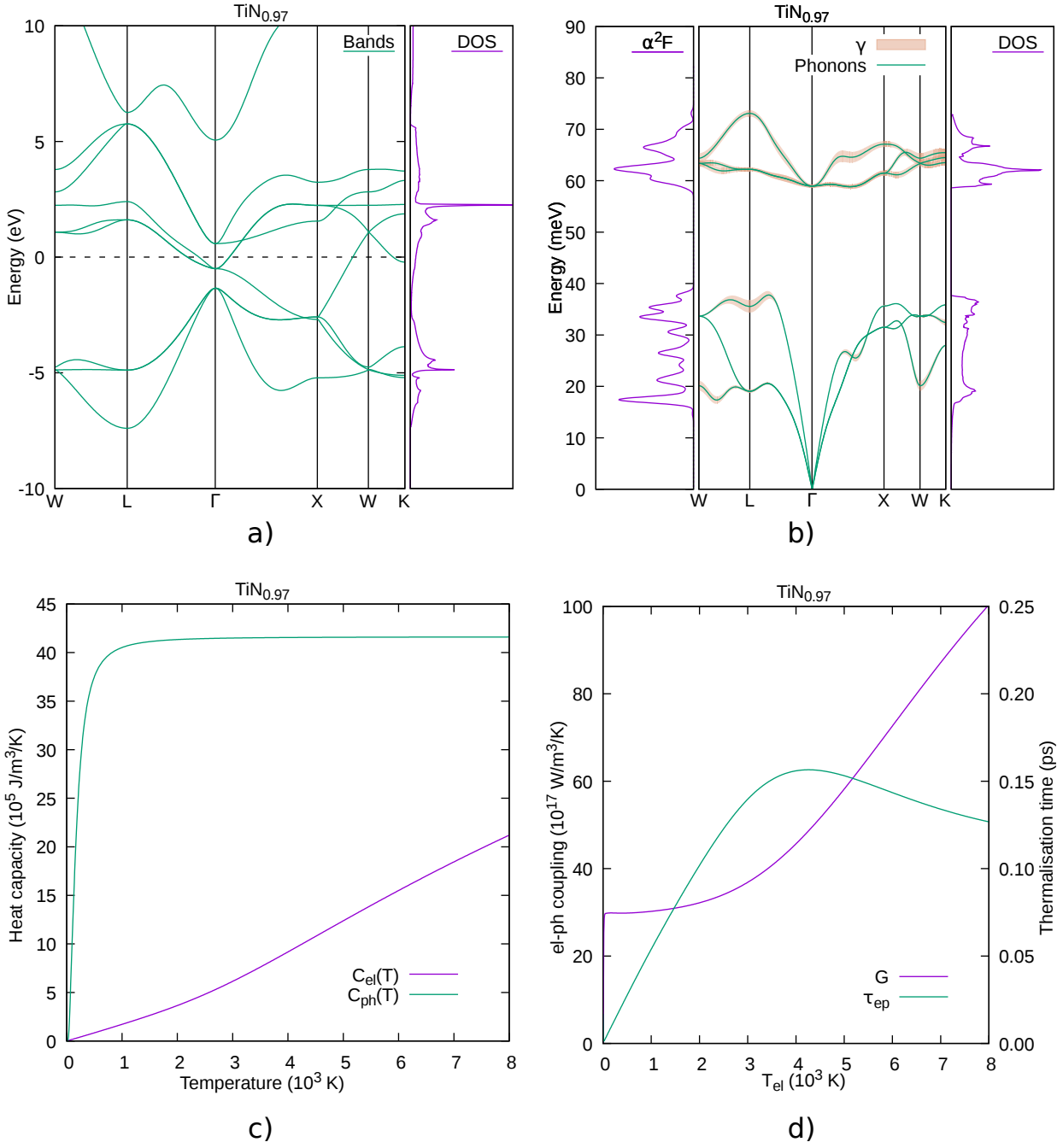

Figure S7: DFT results for $TiN_{0.97}$. a) Electron band structure and DOS (DOS values in the range 0 to 16 states/eV/unitcell). b) Phonon band structure, DOS, phonon linewidths (magnification ×2) and Eliashberg function (DOS and α^2F in the range 0 to 0.12 states/eV/unitcell and 0 to 1.3, respectively). c) Electron and phonon heat capacities. d) Electron-phonon coupling parameter and hot electron thermalisation time.

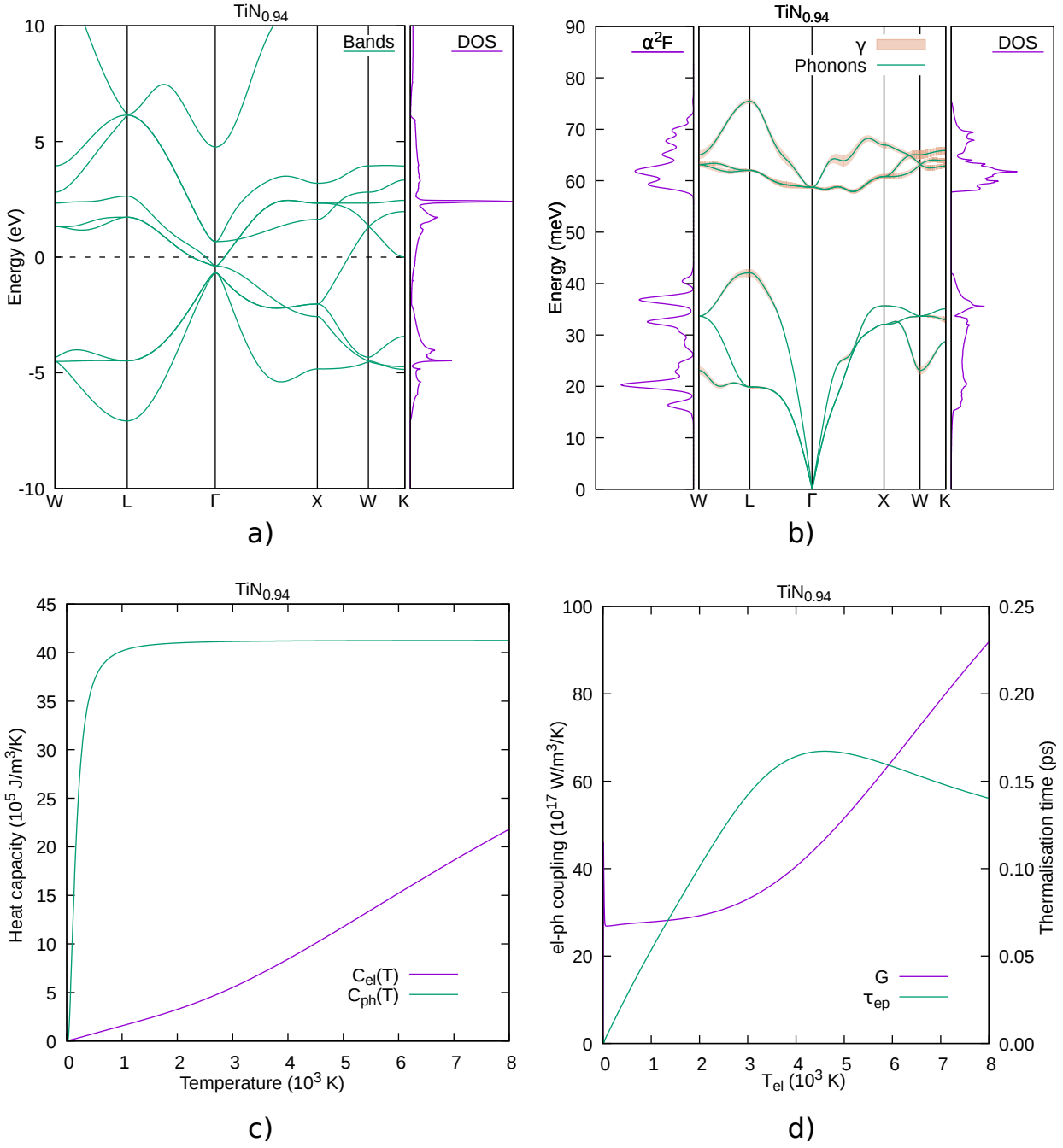

Figure S8: DFT results for $TiN_{0.94}$. a) Electron band structure and DOS (DOS values in the range 0 to 16 states/eV/unitcell). b) Phonon band structure, DOS, phonon linewidths (magnification ×2) and Eliashberg function (DOS and α^2F in the range 0 to 0.12 states/eV/unitcell and 0 to 1.3, respectively). c) Electron and phonon heat capacities. d) Electron-phonon coupling parameter and hot electron thermalisation time.

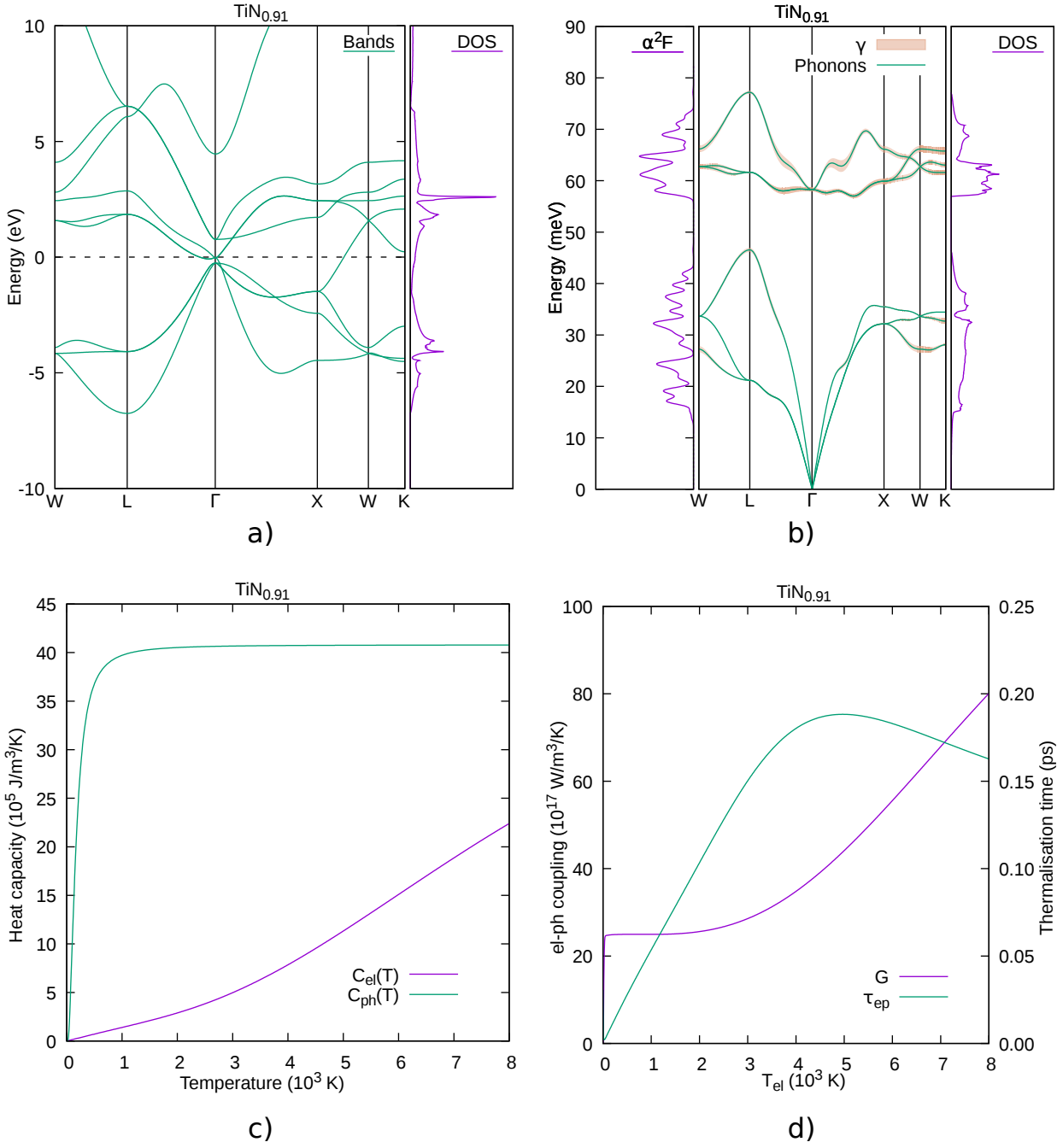

Figure S9: DFT results for $TiN_{0.91}$. a) Electron band structure and DOS (DOS values in the range 0 to 16 states/eV/unitcell). b) Phonon band structure, DOS, phonon linewidths (magnification $\times 2$) and Eliashberg function (DOS and α^2F in the range 0 to 0.12 states/eV/unitcell and 0 to 1.3, respectively). c) Electron and phonon heat capacities. d) Electron-phonon coupling parameter and hot electron thermalisation time.

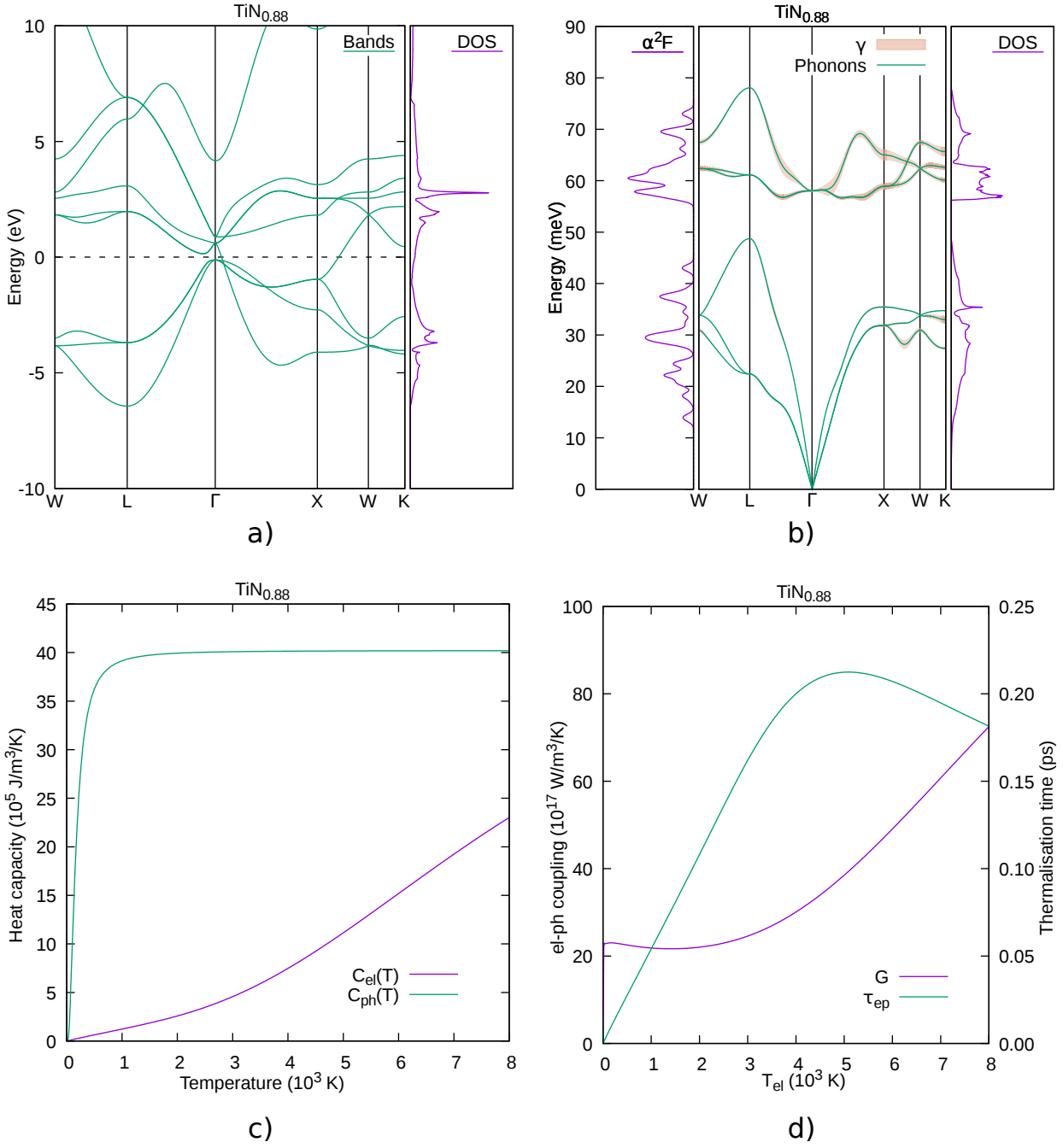

Figure S10: DFT results for $TiN_{0.88}$. a) Electron band structure and DOS (DOS values in the range 0 to 16 states/eV/unitcell). b) Phonon band structure, DOS, phonon linewidths (magnification $\times 2$) and Eliashberg function (DOS and α^2F in the range 0 to 0.12 states/eV/unitcell and 0 to 1.3, respectively). c) Electron and phonon heat capacities. d) Electron-phonon coupling parameter and hot electron thermalisation time.

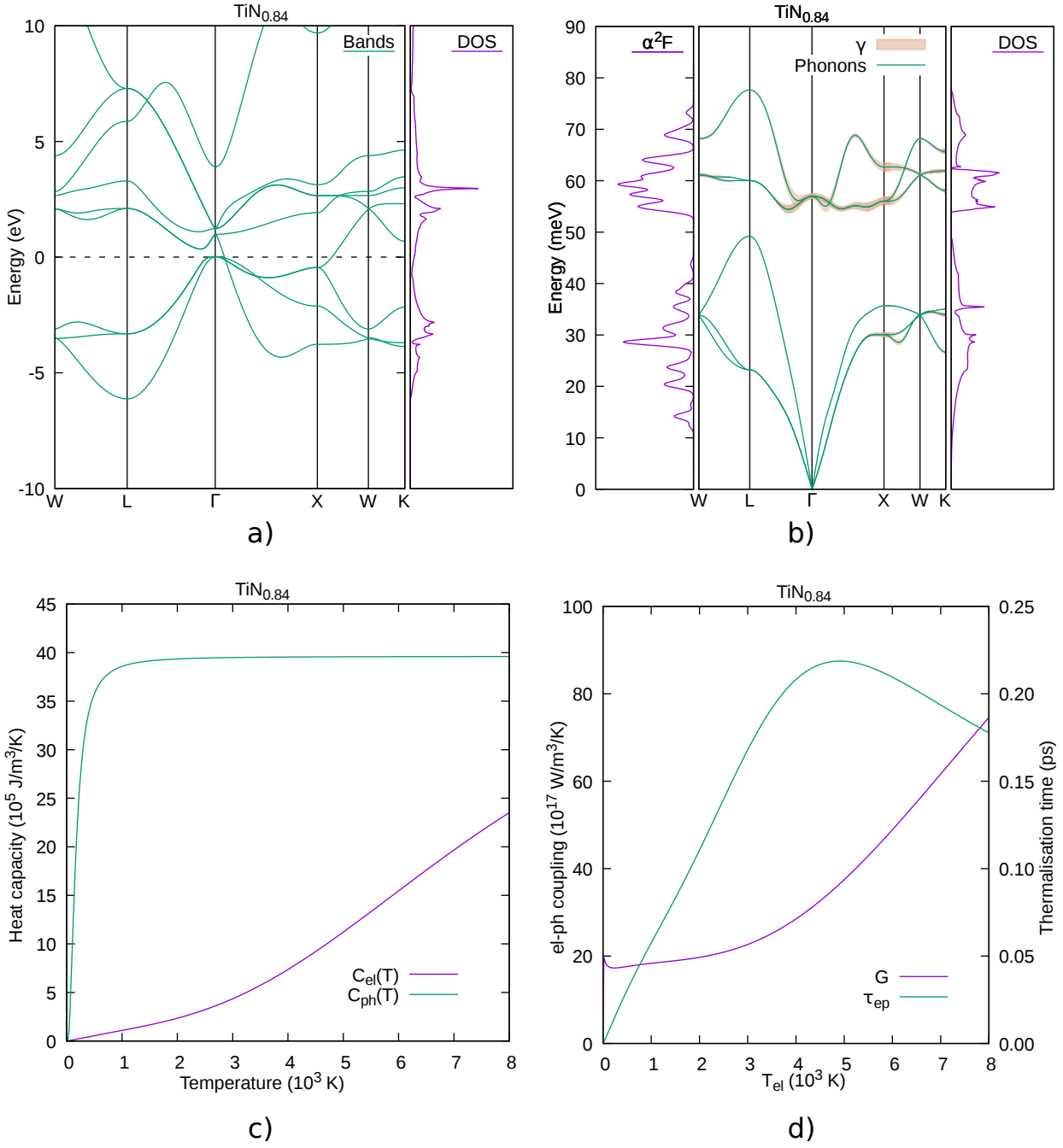

Figure S11: DFT results for $TiN_{0.84}$. a) Electron band structure and DOS (DOS values in the range 0 to 16 states/eV/unitcell). b) Phonon band structure, DOS, phonon linewidths (magnification ×2) and Eliashberg function (DOS and α^2F in the range 0 to 0.12 states/eV/unitcell and 0 to 1.3, respectively). c) Electron and phonon heat capacities. d) Electron-phonon coupling parameter and hot electron thermalisation time.