The Measurement of $^1J(^{187}Os–^{31}P)$

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Summary The first measurement of $^1J(^{187}Os–^{31}P)$ is reported for the complexes $OsH_4(PEt_2Ph)_3$ and *cis*-$OsCl_2(CO)_2(PBu^tPr^n_2)_2$.

ALTHOUGH osmium has a naturally occurring isotope with nuclear spin of one half (^{187}Os, 1·64% abundant), hitherto the only observation of nuclear spin–spin coupling to osmium has been osmium–hydrogen coupling in multihydrido-complexes such as $OsH_4(AsEt_2Ph)_3$.[1] We now report the first measurement of $^1J(^{187}Os–^{31}P)$. The ^{31}P n.m.r. spectra of $OsH_4(PEt_2Ph)_3$ and *cis*-$OsCl_2(CO)_2(PBu^tPr^n_2)_2$ were measured with white noise decoupling of the protons. The results are summarised in the Table, along with data for comparison for tungsten and platinum. It will be observed that for compounds of similar type the reduced coupling constant, $^1K(M–^{31}P)$, for ^{187}Os is intermediate between the value for ^{183}W and ^{195}Pt. This is consistent with the expected increase in *s*-electron density at the nucleus from tungsten to platinum causing the increase in $^1K(M–^{31}P)$.[2]

$^1J(M–^{31}P)$ *and* $^1K(M–^{31}P)$ *for some third-row transition metal complexes*

	$^1J(M–^{31}P)$ Hz	$^1K(M–^{31}P) \times 10^{-20}$ cm^3*
W–P Complexes[2]	200—381	994—1894
trans-$W(CO)_4(PBu^n_3)_2$[3] ..	265	1317
$OsH_4(PEt_2Ph)_3$	166	1490
cis-$OsCl_2(CO)_2(PBu^tPr^n_2)_2$ ..	149·8	1343
Pt–P Complexes[2]	1460—6400	1405—6158
trans-$PtCl_2(PBu^tPr^n_2)_2$[4] ..	2435	2343

* $K(N–N') = J(N–N')\cdot 2\pi/\hbar(\gamma_N\gamma_{N'})$.[5]

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