

## Platinum complexes with thiourea derivatives as ligands: looking for their bonding scheme

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Over the last three decades, there has been increasing interest in platinum complexes with *N,S*-donor ligands as thiourea derivatives. Such complexes may exhibit either higher anticancer activity or reduced toxicity compared to known metal containing drugs, such as cisplatin<sup>1</sup>. Therefore, a series of platinum complexes containing thiourea moieties in their structure was synthesized and their cytotoxicity was assessed. The novel complexes show high activity ( $IC_{50} \leq 10 \mu M$ ) against human primary colon cancer (SW620) and human breast cancer (MDA-MB-231), while showing no toxicity towards the normal cell line.

The synthesized compounds have been structurally characterized. The metal cation to ligand ratio is 1:1 and the presence of chloride anions (derived from the salt used for synthesis) in their structure has been observed. The Pt L3-edge and Cl K-edge XANES spectra indicated the presence of Pt(IV) and Pt(II) complexes in the analyzed group of compounds. A comparison of S K-edge XANES spectra (Fig. 1a) indicated the coordination of the S atom to the metal cation. The shift of the bands, in the ATR-IR spectra, corresponding to the vibrations of the C=S group within the ligand-complex pair confirmed that ligand coordinate to metal cation via S atom of thiourea moiety. The analysis of Pt L3-edge EXAFS spectra for representative Pt(IV) complex (Fig. 1b) revealed four Cl anions (from inorganic salt) and two S atoms (from organic ligand) around metal cation. Based on experimental data and DFT calculations, the molecular structure of the studied complexes has been proposed.

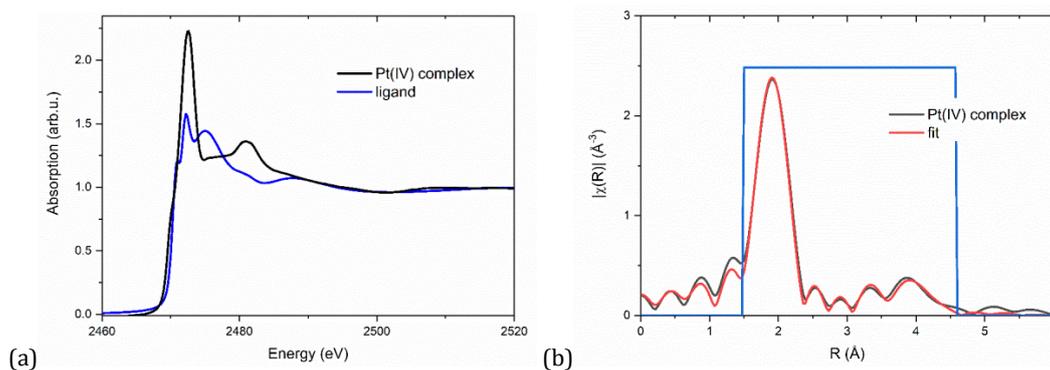


Figure 1 (a) Comparison of S K-edge XANES spectra for representative thiourea ligand–Pt(IV) complex pair; (b) EXAFS fitting of the experimental oscillations (black line) and the fitting result (red line).

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### References

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