

## Synthesis of composite ruthenium containing silica nanomaterials from amine-stabilized ruthenium nanoparticles as elemental bricks

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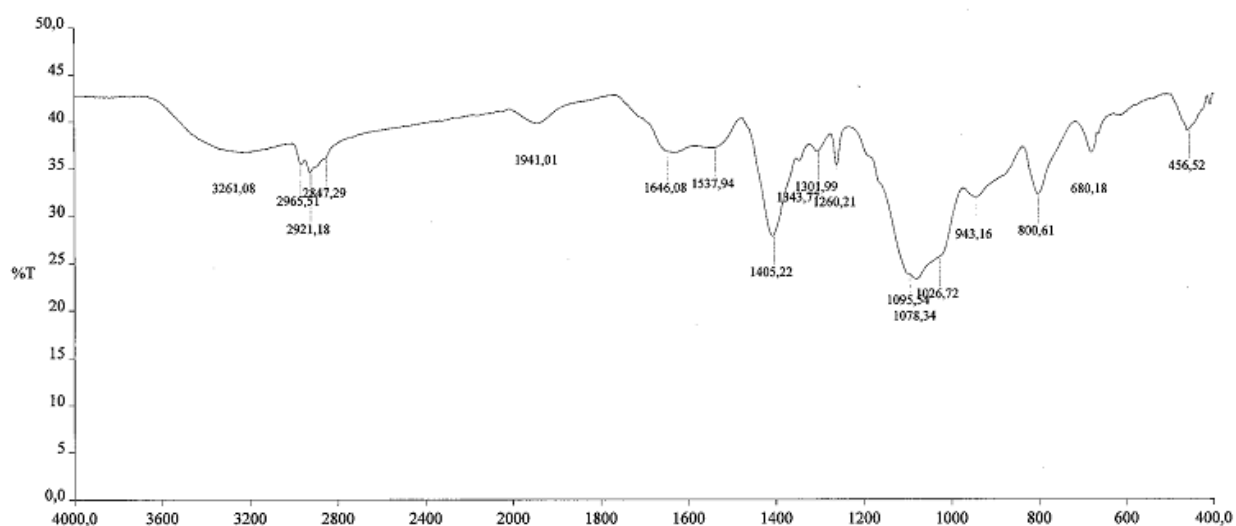
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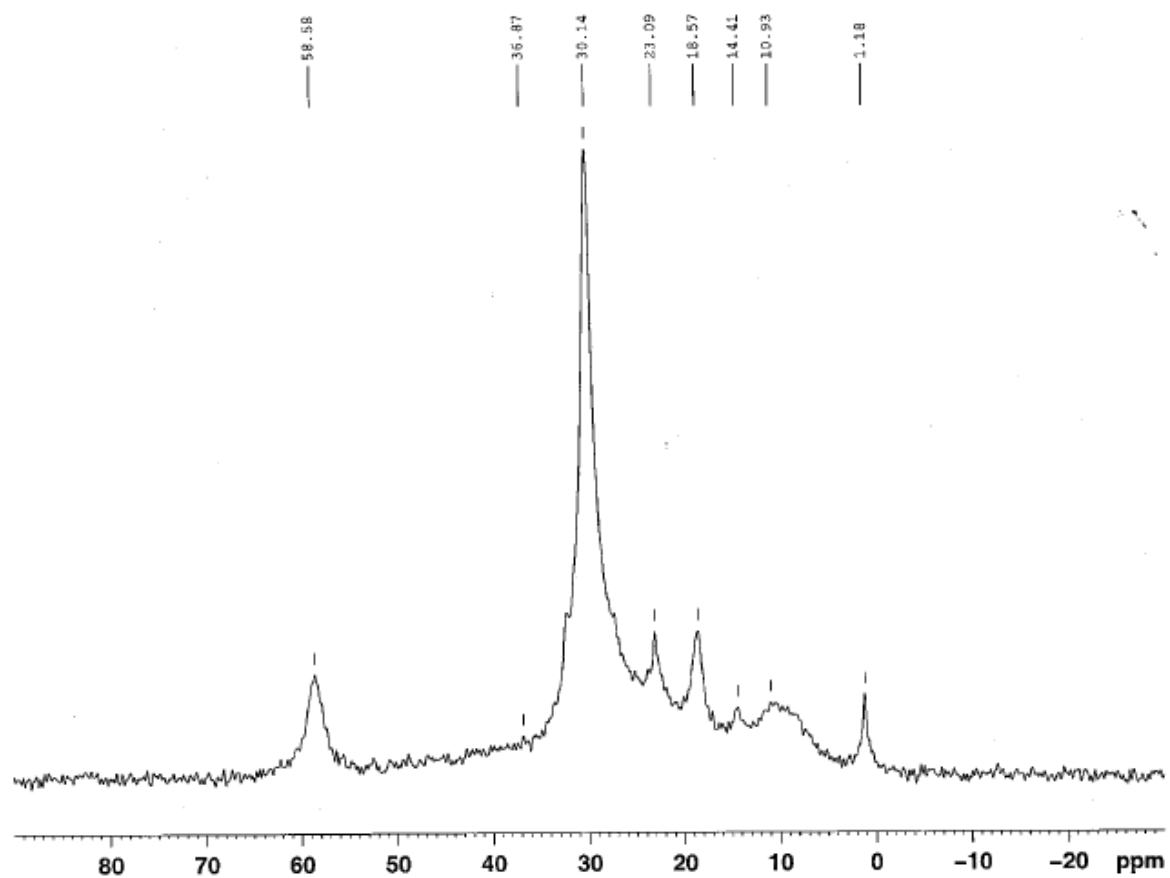
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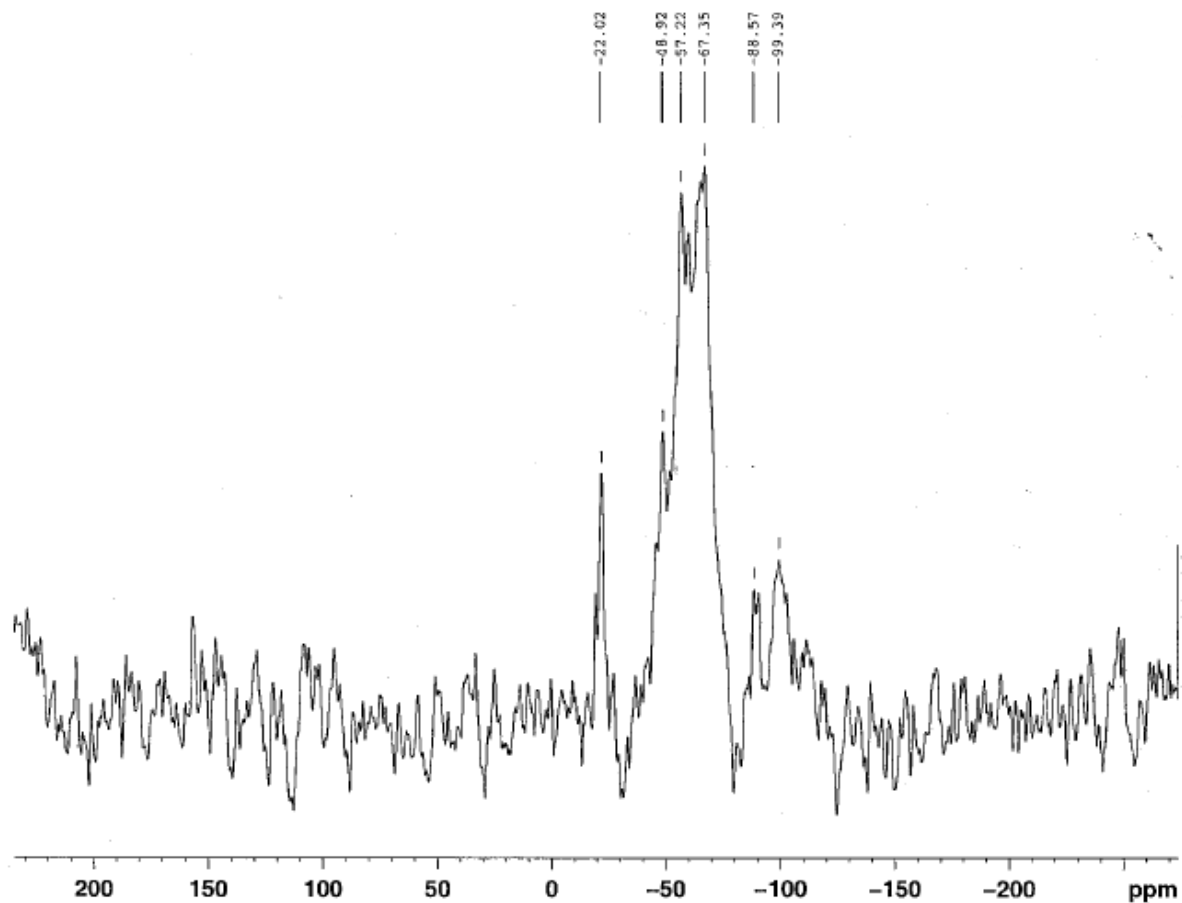
**Fig. S11.** ATR-IR of ruthenium nanoparticles synthesized in the presence of ligand **L1** with  $[L1]/[Ru] = 0.5$



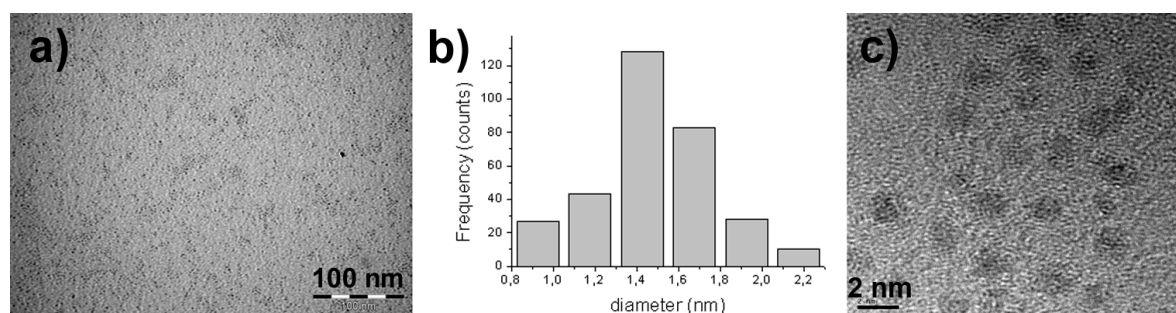
**Fig. SI2.** CP-MAS  $^{13}\text{C}\{^1\text{H}\}$ -NMR of ruthenium nanoparticles synthesized in the presence of ligand **L1** with  $[\text{L1}]/[\text{Ru}] = 0.5$



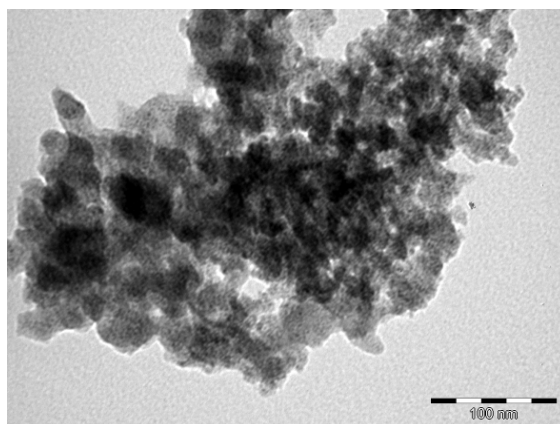
**Fig. S13.** CP MAS  $^{29}\text{Si}\{^1\text{H}\}$ -NMR of ruthenium nanoparticles synthesized in the presence of ligand **L1** with  $[\text{L1}]/[\text{Ru}] = 0.5$



**Fig. S14.** TEM image (a) with corresponding size histogram (b) and HREM image (c) of ruthenium nanoparticles synthesized in the presence of ligand **L1** with  $[\text{L1}]/[\text{Ru}] = 2$



**Fig. SI5.** TEM micrograph of [Ru(0)]@L1' hybrid material for [L1]/[Ru]=1.



**Fig. SI6.** TEM micrograph of [RuO<sub>2</sub>]@SiO<sub>2</sub> solid nanomaterial for [L1]/[Ru]=1.

