

# Formation and Structural Characterization of $[\text{RuCl}_2(\text{CO})_2(\text{SPh}_2)_2]$ , $[\text{RuCl}_2(\text{CO})_3(\text{OH}_2)]$ , and $[\text{Ru}(\text{OH}_2)_6][\text{RuCl}_3(\text{CO})_3]_2 \cdot 2\text{H}_2\text{O}$

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While the room temperature reaction of  $[\text{RuCl}_2(\text{CO})_3]_2$  and  $\text{Ph}_2\text{S}$  in tetrahydrofuran in air affords  $[\text{RuCl}_2(\text{CO})_2(\text{SPh}_2)_2]$  (**1**) in moderate yield, that in dichloromethane results in the formation of a mixture of  $[\text{RuCl}_2(\text{CO})_3(\text{H}_2\text{O})]$  (**2**) and  $[\text{Ru}(\text{H}_2\text{O})_6][\text{RuCl}_3(\text{CO})_3]_2 \cdot 2\text{H}_2\text{O}$  (**3**). Very small amounts of **1** are produced only upon prolonged reflux of the reagents. All compounds were characterized by X-ray crystallography. **1** crystallizes as discrete octahedral *cis*(CO), *cis*(Cl), *trans*( $\text{Ph}_2\text{S}$ ) complexes, which are joined into stacks by weak  $\text{H} \cdots \text{Cl}$  hydrogen bonds. **2** is also composed of discrete octahedral complexes. Four hydrogen bonds involving aqua and chlorido ligands link two complexes into a dimer. The structure of **3** consists of octahedral hexaaquaruthenium cations and two tricarbonyltrichloridoruthenate anions. The water of crystallization is involved in hydrogen bonding between the cations and anions resulting in the formation of a continuous three-dimensional network.

*Key words:* Ruthenium Complex, Diphenyl Sulfide, Crystal Structure