

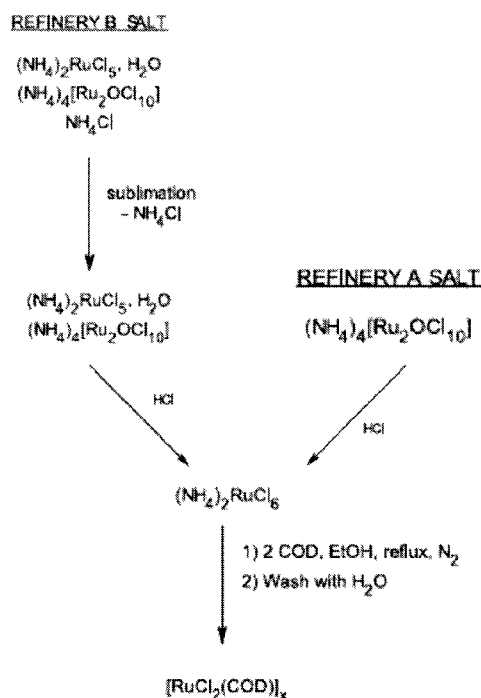


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[Continued on next page]

- (54) Title: METHODS FOR PREPARING RUTHENIUM CARBENE COMPLEX PRECURSORS AND RUTHENIUM CARBENE COMPLEXES

FIG. 2



(57) Abstract: A method for preparing a ruthenium carbene complex precursor includes reacting a ruthenium refinery salt with a hydrogen halide to form a ruthenium intermediate, and reacting the ruthenium intermediate with an L-type ligand to form the ruthenium carbene complex precursor. A method for preparing a ruthenium vinylcarbene complex includes converting a ruthenium carbene complex precursor into a ruthenium hydrido halide complex, and reacting the ruthenium hydrido halide complex with a propargyl halide to form the ruthenium carbene complex. A method for preparing a ruthenium carbene complex includes converting a ruthenium carbene complex precursor into a ruthenium carbene complex having a structure $(\text{PR}^1\text{R}^2\text{R}^3)_2\text{Cl}_2\text{Ru}=\text{CH}-\text{R}^4$, wherein R^1 , R^2 , R^3 , and R^4 are alike or different, and wherein covalent bonds may optionally exist between two or more of R^1 , R^2 , and R^3 and/or two of R^1 , R^2 , and R^3 taken together may optionally form a ring with phosphorous.

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