The new ligand, 2-(2-(5-phenylpyridyl)amino)-1,8-naphthyridine (Hphpyany), was synthesized by the reaction of 2-chloro-1,8-naphthyridine with 2-amino-5-phenylpyridine in the presence of potassium tert-butoxide under palladium(0)-catalyzed condition. The linear tetranickel metal complexes, [Ni₄(phpyany)₄(Cl)₂](CF₃SO₃)₁, [Ni₄(phpyany)₄(Cl)₂](BF₄)₂, [Ni₄(phpyany)₄(NCS)](ClO₄)₃ and [Ni₄(phpyany)₄(NCS)](CF₃SO₃)₂ were synthesized and have been crystallographically characterized. All of the complexes consist of four phpynay ligands, wrapped around a linear tetranickel core, in the same orientation. The remarkably short Ni-Ni distances (ca. 2.33 Å) for 1 and 3 indicate partial metal-metal bonding, which can be viewed as both complexes containing one mixed-valence Ni_{2/3} unit. Magnetic susceptibility measurements reveal that the Ni_{2/3} complexes exhibit antiferromagnetic interactions (J = -42 cm⁻¹ for 1 and -46 cm⁻¹ for 3) between the Ni³⁺ and the Ni²⁺ units, while the Ni⁴⁺ complexes 2 and 4 exhibit antiferromagnetic interactions (J = -33 cm⁻¹ for 2 and -35 cm⁻¹ for 4) between the two terminal Ni²⁺ ions. The results of the cyclic voltammetry indicate the presence two reversible redox couples at E_{1/2}(1) = 0.07 V, E_{1/2}(2) = -0.80 V for 1, and at E_{1/2}(1) = 0.12 V, E_{1/2}(2) = -0.74 V for 3. The products of the oxidation processes E_{1/2}(1) of 1 and 3 are the corresponding oxidized species 2 and 4, respectively. The value of conductance is 9.39 (±0.301)×10⁻⁴ G₀ and the value of resistance is 13.7 (±4.4) MΩ for 4 were measured by means of the STM break-junction. This represents the first conductance measurement of a linear tetranickel chain.

**Keywords:** Metal-metal interactions, Nitrogen ligands, Electrochemistry, Magnetic properties, Single molecular conductance