



Design and Synthesis of New Symmetrical Schiff Bases

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ABSTRACT

A series of symmetrical multidentate Schiff base ligands **1–13** based on the *N,N'*-(4,4'-ethylenbiphenyl) bis-3-methoxysalicylideneimine with different range of color from yellow, orange, brown, cream to red has been synthesized, purified and characterized. These multidentate Schiff base ligands were used to prepare the galvanic cell of the type $Ag|AgCl|NiCl_2$ for potentiometric determination of activity coefficients of $NiCl_2$ in water-glucose mixtures at 298.15 K, and also to bind various transition metals as membrane sensors. Prog. Color Colorants Coat. 4(2011), 113-120. © Institute for Color Science and Technology.

1. Introduction

Schiff bases and their transition metal complexes are currently of significant interest even though they have been prepared for decades. They have been used in various applications such as catalysis, corrosion protection, molecular sensors, antibacterial, antifungal, antimicrobial, anticonvulsant, anti-HIV, anti-inflammatory and antitumor fields [1-2].

Hannon's group has prepared a range of rigid Schiff base ligands based on inexpensive starting materials [3]. The synthesis of these compounds is based on the addition of an aldehyde to a diamine (a method for long been used by coordination chemists to prepare ligands such as salens) with convergent binding sites.

Multifunctional ligands with the potential for extended hydrogen bonding or metal mediated polymerization may be prepared from 1, 3- or 1, 4-dihydroxybenzaldehyde.

The development of optical sensors has become a rapidly expanding area of analytical chemistry mainly due to their simple preparation, reasonable selectivity and sensitivity with no further need for separate reference devices. In comparison with ion-selective electrodes, they do not require internal and external reference devices, long preconditioning time is not a pre-requisite for use, and are not subjected to electrical noise [4-7]. Optical sensors required simple instrumentation and are suitable for multi-sensor array fabrication. Optical sensors that make use of plasticized polymer membranes

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containing a reagent which reacts with the analyte to produce a distinctive color change are of great interest among other applications of the trace analysis of heavy metal ions [8-9].

2. Experimental

Chemicals were purchased from Merck and Fluka. Melting points were measured on an Electrothermal 9100 apparatus and are uncorrected. ^1H NMR spectra were obtained on a Bruker 500MHz instrument and are reported in ppm using various solvents as internal standards (CDCl_3 at 7.26 ppm, $(\text{CD}_3)_2\text{SO}$ at 2.50 ppm). UV-Visible spectra were measured with a Varian Cary 100 spectrophotometer. FT-IR spectra were recorded on a Shimadzu FT-IR 8400S spectrometer.

The general procedure for the synthesis of Schiff bases **1-13** is as follows:

A mixture of 4,4'-diaminobibenzyl (1g, 5 mmol) and various aldehydes (10 mmol) in EtOH (40 ml) is stirred at room temperature for 1 day. The color was changed gradually and finally a solid compound was precipitated. The reaction mixture was filtered, washed with EtOH and then purified by recrystallization which finally yielded the desired compounds.

2.1. 4,4'-Dinitrobibenzyl (**14**, $\text{C}_{14}\text{H}_{16}\text{N}_2$)

methanolic potassium hydroxide solution 33% (17g KOH, in 50 ml MeOH) was added to a beaker equipped with a mechanical stirrer. Beaker was immersed in an ice bath. After the solution was cooled to 10 °C, 4-nitrotoluene (2.5g, 0.02mol) was added to the wide open dish. After 3 hours, the mixture was removed from the ice bath. The obtained yellow mixture was vigorously stirred at room temperature for 3 days. Solids washed with EtOH, then purified by recrystallization from toluene to afford 1.5 g (61%) **14**. M.p.: 178-180°C; as an orange solid; IR (KBr): 1595-1458 (C = C), 1512,1340 (NO_2); ^1H NMR (500 MHz, CDCl_3): [8.18-8.20 (d, 2H, $^3J = 8.6$ Hz)], [7.3 (d, 2H, $^3J = 8.6$ Hz)], [3.5(s, 2H)]; HRMS (m/z): calcd 272.0797, found 272.0794; Anal. calcd for $\text{C}_{14}\text{H}_{12}\text{N}_2\text{O}_4$: C, 61.76; H, 4.44; N, 10.29; found: C, 61.74; H, 4.42; N, 10.31.

2.2. 4,4'-Diaminobibenzyl (**15**, $\text{C}_{14}\text{H}_{16}\text{N}_2$)

4,4'-dinitrobibenzyl (0.27g, 1mmol) in EtOH 96% (20 ml) and zinc dust (5.4g, 82 mmol) was added to a solution of CaCl_2 (0.18g, 1.62 mmol) in water (1ml). The mixture was refluxed for 2 hours. The progress of the

reaction was monitored by TLC (petroleumether/EtOAc 4:2). The sludge of zinc dust and zinc oxide was filtered from the boiling solution. Then, the combined filtrates were poured into the water (40 ml). The solid precipitate was filtered and recrystallized from EtOH to yield 0.135 g (75%) of **15**, M.p.: 134 °C; as a yellow solid; IR (KBr): 3450-3350 (NH), 1618-1515 (C = C); ^1H NMR (500 MHz, CDCl_3): [2.7(s, 2H)], [6.6 (d, 2H, $^3J = 8.3$ Hz)], [7(d, 2H, $^3J = 8.3$)], [3.5 (s, 2H)]; HRMS (m/z): calcd 212.1313, found 212.1316. Anal. calcd for $\text{C}_{14}\text{H}_{16}\text{N}_2$: C, 79.21; H, 7.60; N, 13.20; found: C, 79.23; H, 7.61; N, 13.19.

2.3. N,N'-(4,4'-ethylenebiphenyl)bis (salicylideneimine) (**1**, $\text{C}_{14}\text{H}_{16}\text{N}_2$)

Yield 63%; M.p.: 222-224°C; as a yellow solid; IR (KBr): 3479 (OH), 1618 (CN), 1568-1492 (C = C); ^1H NMR (500 MHz, CDCl_3): [13.3 (s, 1H)], [8.6 (s,1H)], [7.39-7.43 (m, 2H)], [7.25 (s, 4H)], [7(d, 1H, $^3J = 7.2$ Hz)], [6.9 (t, 1H, $^3J = 7.4$ Hz)], [3(s, 2H)]; HRMS (m/z): calcd 420.1838, found 420.1834; Anal. calcd for $\text{C}_{14}\text{H}_{16}\text{N}_2$: C, 79.98; H, 5.75; N, 6.66; found: C, 79.96; H, 5.75; N, 6.66.

2.4. N, N'-(4,4'-ethylenebiphenyl) bis (3-methoxy salicylideneimine) (**2**, $\text{C}_{30}\text{H}_{28}\text{N}_2\text{O}_4$)

Yield 91%; M.p.: 224-226°C; as an orange solid; IR (KBr): 3450 (OH), 1620 (CN), 1470 (C = C); ^1H NMR (500MHz, $\text{CDCl}_3/\text{DMSO}$): [13.4 (s, 1H)], [8.3 (s, 1H)], [6.91 (s, 4H)], [6.7 (dd, 1H, $^4J = 1.1\text{Hz}$, $^3J = 7.8$ Hz)], [6.6 (d, 1H, $^3J = 7.8$ Hz)], [6.5(t, 1H, $^3J = 7.8$ Hz)], [3.58 (s, 3H)], [2.64 (s, 2H)]; HRMS (m/z): calcd 480.2049, found 480.2051; Anal. calcd for $\text{C}_{30}\text{H}_{28}\text{N}_2\text{O}_4$: C, 74.98; H, 5.87; N, 5.83; found: C, 74.96; H, 5.88; N, 5.81.

2.5. N, N'-(4,4'-ethylenebiphenyl) bis (3-hydroxy salicylideneimine) (**3**, $\text{C}_{28}\text{H}_{24}\text{N}_2\text{O}_4$)

Yield 92%; M.p.: 244-248°C; as a red solid; IR (KBr): 3440-3379 (OH), 1622 (CN), 1575-1460 (C = C); ^1H NMR (500 MHz, DMSO): [13.3 (s, 1H)], [9.19 (s, 1H)], [8.91 (s, 1H)], [7.32 (d, 2H, $^3J = 8.5$)], [7.33-7.35 (d, 2H, $^3J = 8.5$ Hz)], [7(dd, 1H, $^4J = 1.3$ Hz, $^3J = 7.8$ Hz)], [6.9 (dd, 1H, $^4J = 1.3$ Hz, $^3J = 7.8$ Hz)], [6.76-6.79 (t, 1H, $^3J = 7.7$ Hz)], [2.9 (s, 2H)]; HRMS (m/z): calcd 452.1736, found 452.1739; Anal. calcd for $\text{C}_{28}\text{H}_{24}\text{N}_2\text{O}_4$: C, 74.32; H, 5.35; N, 6.19; found: C, 74.30; H, 5.32; N, 6.21.

2.6. N, N'-(4,4'-ethylenebiphenyl) bis (4-chloro benzylideneimine) (4, C₂₈H₂₂Cl₂N₂)

Yield 92%; M.p.: 240-244°C; as a yellow solid; IR (KBr): 1623 (CN), 1587-1566 (C = C), 1083 (C – Cl); ¹H NMR (500 MHz, CDCl₃/DMSO): [8.23 (s, 1H)], [7.6 (d, 2H, ³J = 8.3 Hz)], [7.21- 7.23 (d, 2H, ³J = 8.3 Hz)], [6.96-6.98 (d, 2H, ³J = 8.1 Hz)], [6.91-6.93 (d, 2H, ³J = 8.1 Hz)], [2.73(s, 2H)]; HRMS (m/z): calcd 456.116, found 456.113; Anal. calcd for C₂₈H₂₂Cl₂N₂: C, 73.53; H, 4.85; N, 6.12; found: C, 73.53; H, 4.86; N, 6.14.

2.7. N, N'-(4,4'-ethylenebiphenyl) bis (2,4-dichloro benzylideneimine) (5, C₂₈H₂₀Cl₄N₂)

Yield 83%; M.p.: 213-215°C; as a yellow solid; IR (KBr): 1616 (CN), 1575-1460 (C = C), 1069 (C – Cl); ¹H NMR (500 MHz, CDCl₃/DMSO): [8.8 (s, 1H)], [8.1 (d, 1H, ³J = 8.4 Hz)], [7.4 (d, 1H, ⁴J = 1.89 Hz)], [7.3 (dd, 1H, ⁴J = 1.3 Hz, ⁴J = 8.4 Hz)], [7.19-7.20 (d, 2H, ³J = 8.4 Hz)], [7.17 (d, 2H, ³J = 8.2 Hz)], [2.9 (s, 2H)]; HRMS (m/z): calcd 524.0381, found 524.0382; Anal. calcd for C₂₈H₂₀Cl₄N₂: C, 63.90; H, 3.83; N, 5.32; found: C, 63.91; H, 3.85; N, 5.31.

2.8. N, N'-(4,4'-ethylenebiphenyl) bis (N, N-dimethyl aminobenzylideneimine) (6, C₃₂H₃₄N₄)

Yield 63%; M.p.: 257-260°C; as a orange solid; IR (KBr): 1606 (CN), 1583-1525 (C = C); ¹H NMR (500 MHz, CDCl₃): [8.3 (s, 1H)], [7.79-7.81 (d, 2H, ³J = 8.7 Hz)], [7.20-7.21 (d, 2H, ³J = 8.1 Hz)], [7.15-7.17 (d, 2H, ³J = 7.9 Hz)], [6.7(d, 2H, ³J = 8.7 Hz)], [3(s, 6H)], [2.9 (s, 2H)]; HRMS (m/z): calcd 474.2783, found 474.2781; Anal. calcd for C₃₂H₃₄N₄: C, 80.98; H, 7.22; N, 11.80; found: C, 80.99; H, 7.21; N, 11.82.

2.9. N, N'-(4,4'-ethylenebiphenyl) bis (4-hydroxy-3-methoxybenzylideneimine) (7, C₃₀H₂₈N₂O₄)

Yield 54%; M.p.: 212-216°C; as a yellow solid; IR (KBr): 3400-3000 (OH), 1623 (CN), 1593-1460 (C = C); ¹H NMR (500MHz, DMSO): [7.5 (d, 1H, ⁴J = 1.53 Hz)], [7.3 (dd, 1H, ⁴J = 1.6Hz, ³J = 8.1 Hz)], [7.23-7.24 (d, 2H, ³J = 8.2 Hz)], [7.12-7.14 (d, 2H, ³J = 8.2 Hz)], [6.8-6.9 (d, 1H, ³J = 8.07 Hz)], [3.8 (s, 3H)], [2.8 (s, 2H)]; HRMS (m/z): calcd 480.2049, found 480.2051; Anal. calcd for C₃₀H₂₈N₂O₄: C, 74.98; H, 5.87; N, 5.83; found: C, 74.96; H, 5.87; N, 5.81.

2.10. N, N'-(4,4'-ethylenebiphenyl) bis (4-nitrobenzylidene imine) (8, C₂₈H₂₂N₄O₄)

Yield 50%; M.p.: 192-195°C; as an orange solid; IR

(KBr): 1620 (CN), 1600 (C = C), 1512,1335 (NO₂); ¹H NMR (500 MHz, CDCl₃): [8.75 (s, 1H)], [8.3 (dd, 2H, ⁴J = 2Hz, ³J = 8.9 Hz)], [8 (dd, 2H, ⁴J = 2Hz, ³J = 9Hz)], [7.21 (s, 4H)], [2.98 (s, 2H)]; HRMS (m/z): calcd 478.1641, found 478.1644; Anal. calcd for C₂₈H₂₂N₄O₄: C, 70.28; H, 4.63; N, 11.71, found: C, 70.26; H, 4.63; N, 11.72.

2.11. N, N'-(4,4'-ethylenebiphenyl) bis (pyridine-2-yle-imine) (9, C₂₆H₂₂N₄)

Yield 85%; M.p.: 203-205°C; as a yellow solid; IR (KBr): 1625 (CN), 1579-1566 (C = C); ¹H NMR (500 MHz, CDCl₃): [8.74-8.75 (dd, 1H, ⁴J = 0.8 Hz, ³J = 4.8 Hz)], [8.66 (s, 1H)], [8.2 (d, 1H, ³J = 8 Hz)], [7.83-7.86 (td, 1H, ⁴J = 1.5 Hz, ³J = 7.6 Hz)], [7.38-7.41 (dd, 1H, ³J = 4.8 Hz, ³J = 7.5 Hz)], [7.25-7.26 (d, 2H, ³J = 8.4 Hz)], [7.27-7.29 (d, 2H, ³J = 8.9 Hz)], [3(s, 2H)]; HRMS (m/z): calcd 390.1844, found 390.1841; Anal. calcd for C₂₆H₂₂N₄: C, 79.97; H, 5.68; N, 14.35, found: C, 79.96; H, 5.69; N, 14.35.

2.12. N, N'-(4,4'-ethylenebiphenyl) bis (furan-2-yle-imine) (10, C₂₄H₂₀N₂O₂)

Yield 65%; M.p.: 193-196°C; as a yellow solid; IR (KBr): 1627 (CN), 1596-1471 (C = C); ¹H NMR (500 MHz, CDCl₃): [8.34(s, 1H)], [7.65 (s, 1H)], [7.22 (s, 4H)], [6.99 (s, 1H)], [6.60 (dd, 1H, ⁴J = 1.7 Hz, ³J = 3.4 Hz)], [2.98 (s, 2H)]; HRMS (m/z): calcd 368.1525, found 368.1528; Anal. calcd for C₂₄H₂₀N₂O₂: C, 78.24; H, 5.47; N, 7.60, found: C, 78.24; H, 5.49; N, 7.62.

2.13. N, N'-(4,4'-ethylenebiphenyl) bis (thiophen-2-yle-imine) (11, C₂₄H₂₀N₂S₂)

Yield 83%; M.p.: 192-194°C; as a yellow solid; IR (KBr): 1612 (CN), 1585-1458 (C = C); ¹H NMR (500 MHz, CDCl₃): [8.61 (s, 1H)], [7.54 (d, 1H, ³J = 5Hz)], [7.51 (d, 1H, ³J = 3.4 Hz)], [7.21-7.16 (m, 5H)], [2.97 (s, 2H)]; HRMS (m/z): calcd 400.1068, found 368.1528; Anal. calcd for C₂₄H₂₀N₂S₂: C, 71.96; H, 5.03; N, 6.99, found: C, 71.95; H, 5.02; N, 6.98.

2.14. 4-((2-chlorobenzo [h] quinoline-3-yl) methylene-amino)phenethyl)-N-((2-chlorobenzo [h] quinoline-3-yl) methylene) benzenamine (12, C₄₂H₂₈Cl₂N₄)

Yield 74%; M.P.: 292-293°C; as a yellow solid; IR (KBr): 1617 (CN), 1580-1500 (C = C), 1060 (C – Cl); ¹H

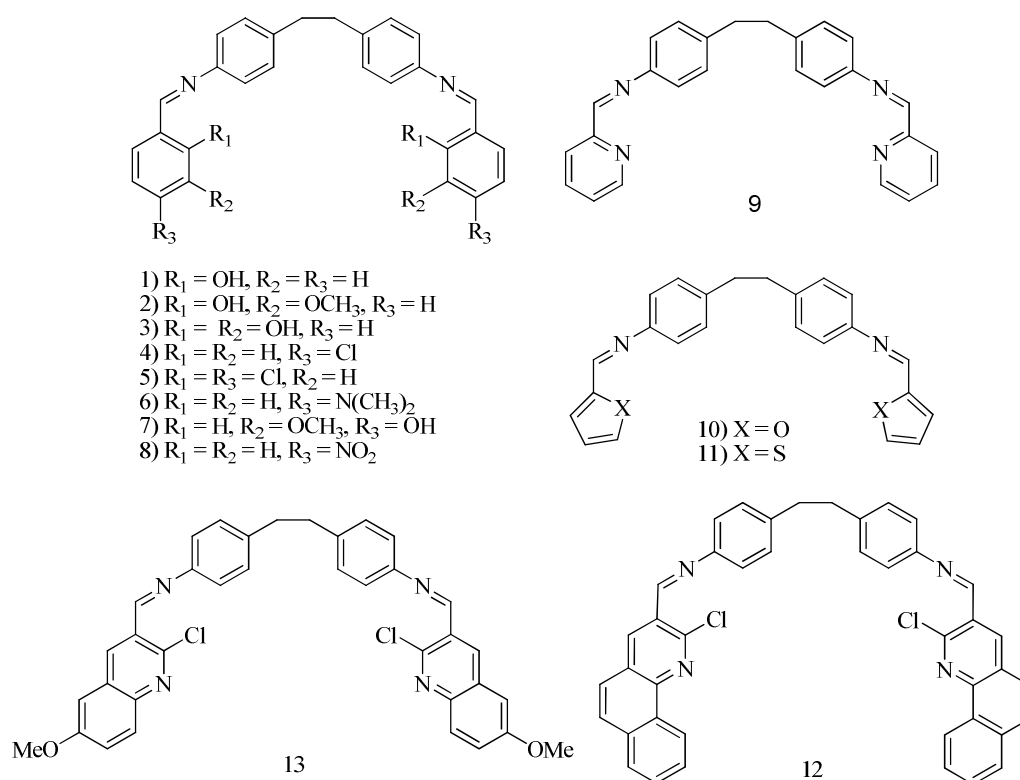
NMR (500 MHz, CDCl_3): [3.08 (s, 2H)], [7.33 (d, 2H, $^3J=8.2$ Hz)], [7.39 (d, 2H, $^3J=7.9$ Hz)], [7.80-7.82 (m, 2H)], [7.86 (d, 1H, $^3J=8.6$ Hz)], [7.92 (d, 1H, $^3J=8.8$ Hz)], [7.96-7.98 (m, 1H)], [9.13 (s, 1H)], [9.22 (s, 1H)], [9.27-9.31 (m, 1H)]. HRMS (m/z): calcd 658.1738, found 658.1740; Anal. calad for $\text{C}_{42}\text{H}_{28}\text{Cl}_2\text{N}_4$: C, 76.48; H, 4.28; N, 8.49, found: C, 76.46; H, 4.29; N, 8.48.

2.15. 4-((2-chloro-6-methoxyquinoline-3-yl)methyleneamino) phenethyl -N-((2-chloro-6-methoxyquinoline-3-yl)methylen) benzenamine (13, $\text{C}_{36}\text{H}_{28}\text{Cl}_2\text{N}_4\text{O}_2$)

Yield 27%; M.p.: 290-291°C; as a yellow solid; IR (KBr): 1618 (CN), 1580-1495 (C=C), 1055 (C-Cl); ^1H NMR (500 MHz, CDCl_3): [3.06 (s, 2H)], [3.96 (s, 3H)], [7.25 (s, 1H)], [7.41 (d, 2H, $^3J=8.3$ Hz)], [7.49 (d, 1H, $^3J=9.1$ Hz)], [7.67 (d, 2H, $^3J=8.3$ Hz)], [7.99 (d, 1H, $^3J=9.2$ Hz)], [9.04 (s, 1H)], [9.08 (s, 1H)]; HRMS (m/z): calcd 618.1644, found 618.1645; Anal. Calad for $\text{C}_{36}\text{H}_{28}\text{Cl}_2\text{N}_4\text{O}_2$: C, 69.79; H, 4.56; N, 9.04, found: C, 69.77; H, 4.57; N, 9.05.

3. Results and discussion

2-Hydroxy Schiff base ligands derived from diamines and phenolic aldehydes have proved to be the source of versatile ligands for many transition metals. Recently we used potentiometric as membrane sensors based on N,N' -(4,4'-ethylene biphenyl) bis (3-methoxysalicylidene imine), 6-(4-nitrophenyl)-2-phenyl-4,4-dipropyl-3,5-diaza-bicyclo [3,1,0]hex-2-ene and N_3 -(2,4-dinitro-phenyl)- N,N' -diethyl-penta-1,3-diene-1,5-diamine for detection of Ag(I), Cu(II), Sr (II), Co(II) and Ni(II) at trace levels in naturally obtained samples [10-17]. In this article, we report for the first time the synthesis of new symmetrical Schiff bases **1-13** to prepare galvanic cell of type $\text{Ag}|\text{AgCl}|\text{NiCl}_2$ electrodes for potentiometric determination of activity coefficients for NiCl_2 in water and glucose mixtures at 298.15 K and also to bind various transition metals as membrane sensors (Scheme 1). In this efforts, at the first stage, 4,4'- dinitrobenzyl **14** was prepared from *p*-nitrotoluene in the presence of methanolic potassium hydroxide. Then **14** was reduced to corresponding diamines **15**. The reaction of 4,4'-diaminobiphenyl with various aldehydes lead to the preparation of several Schiff bases.



Scheme 1: Structures of Schiff base compounds 1-13.

For synthesis of 4,4'-diaminobibenzyl **15**, 4-nitrotoluene was dimerized to give 4,4'-dinitrobibenzyl **14** in 61% yield by oxidation in the presence of air in methanolic potassium hydroxide solution utilizing wide dish without using oxygen gas cylinder and/or any catalyst. The 4,4'-diaminobibenzyl **15** was obtained in 75% yield by reducing 4,4'-dinitrobibenzyl **14** in the presence of CaCl_2 and zinc dust in EtOH (Scheme 2).

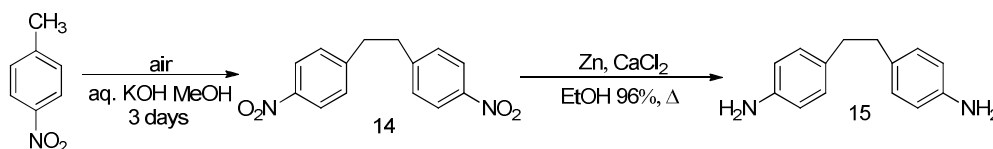
The general preparation of Schiff bases **1-13** is depicted in Scheme 3, they were prepared by the reaction of one equivalent of the premade 4,4'-diaminobibenzyl **15** and two equivalents of various aldehydes and premade substituted aldehydes in EtOH.

There are two types of intramolecular hydrogen bonds in Schiff bases [either $\text{N}\cdots\text{H}\cdots\text{O}$ (keto form) or $\text{N}\cdots\text{H}\cdots\text{O}$ (enol form)]. The enol-imine tautomer form is

dominant in Schiff bases **1-3**. The existence of intramolecular hydrogen bonding ($\text{N}\cdots\text{H}\cdots\text{O}$) in the solution was confirmed for Schiff bases **1-3** by ^1H NMR spectroscopy.

Spectroscopy studies of the compounds illustrated that the enol-imine forms dominates in CDCl_3 and DMSO solvents. The signals of the OH proton which is involved in intramolecular hydrogen bonding appear in the 13-13.3 ppm. The UV-Vis spectra of the compounds **1-3** (Figure 1) were studied in polar and non-polar solvents.

The effects of solvent are due to the hydrogen bonding both as proton donors and proton acceptors, thereby permitting the proton transfers that result in the formation of the keto form. As a proton donor, the solvent interacts with the non-bonding electron pair of the azomethine nitrogen.



Scheme 2: Synthesis of 4,4'-diaminobibenzyl from 4-nitrotoluene.

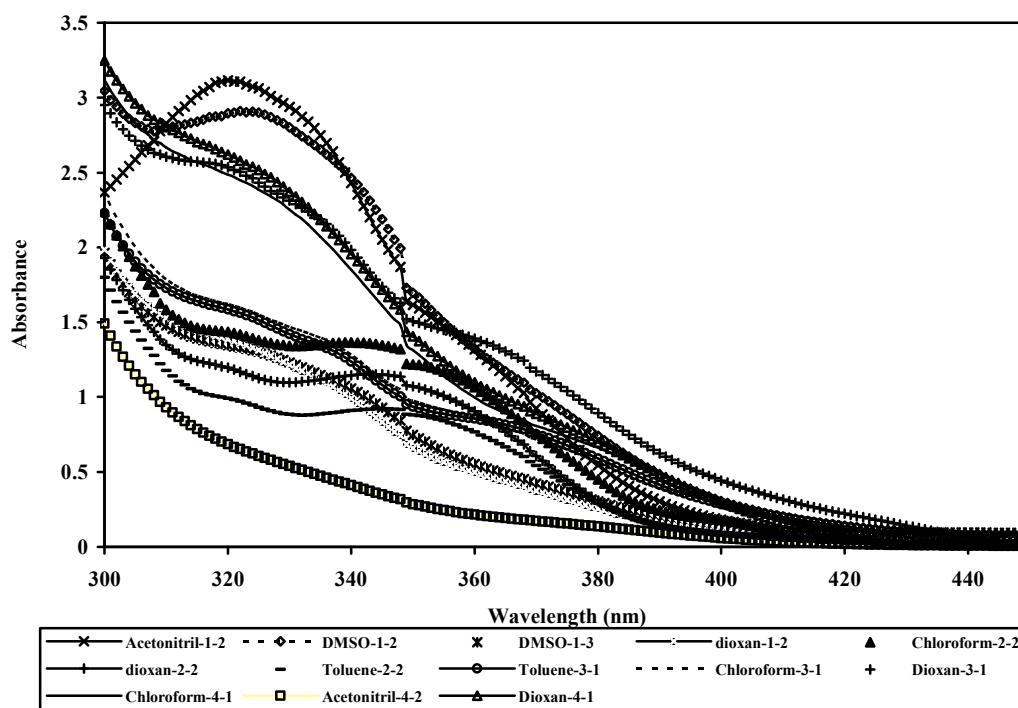
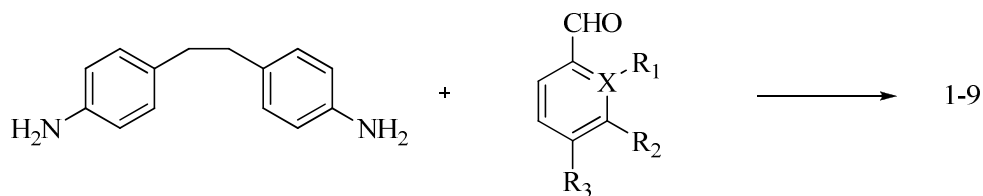


Figure 1: The solvent effect on compounds 1, 2 and 3, with the schiff base concentration of 5×10^{-5} M.

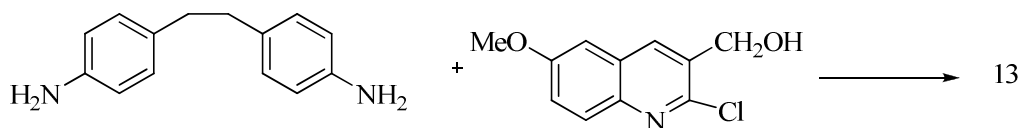
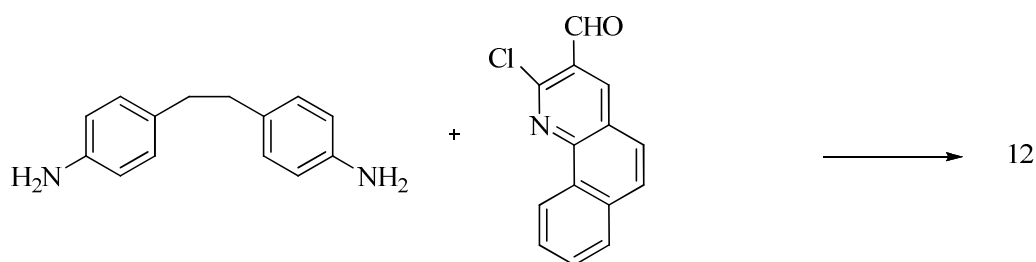
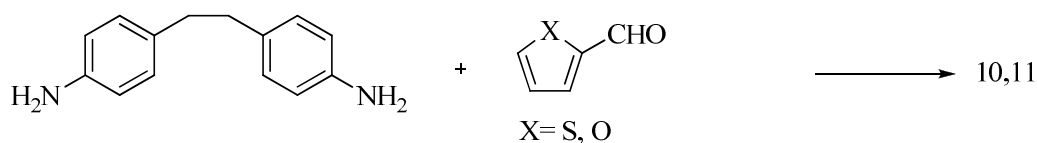
Thus it may be assumed that in those Schiff base derivatives where non-bonding electron pair is no longer available, a solvent effect will not be observed. The UV-Visible spectra of the Schiff bases 1-3 showed one absorption band in DMSO, CHCl₃, toluene and CH₃CN.

The spectroscopic data both in polar and nonpolar solvents suggest that these compounds exist mainly in the enol-imine forms.

Detailed identification spectra and analytical data of compounds 1-13 are available in supporting information.



- 1) R₁ = OH, R₂ = R₃ = H, X = C
- 2) R₁ = OH, R₂ = OCH₃, R₃ = H, X = C
- 3) R₁ = R₂ = OH, R₃ = H, X = C
- 4) R₁ = R₂ = H, R₃ = Cl, X = C
- 5) R₁ = R₃ = Cl, R₂ = H, X = C
- 6) R₁ = R₂ = H, R₃ = N(CH₃)₂, X = C
- 7) R₁ = H, R₂ = OCH₃, R₃ = OH, X = C
- 8) R₁ = R₂ = H, R₃ = NO₂, X = C
- 9) R₁ = none, R₂ = R₃ = H, X = N



Scheme 3: Synthetic route for the preparation of compounds 1-13 and color of schiff bases 1, 2, 4 and 6.

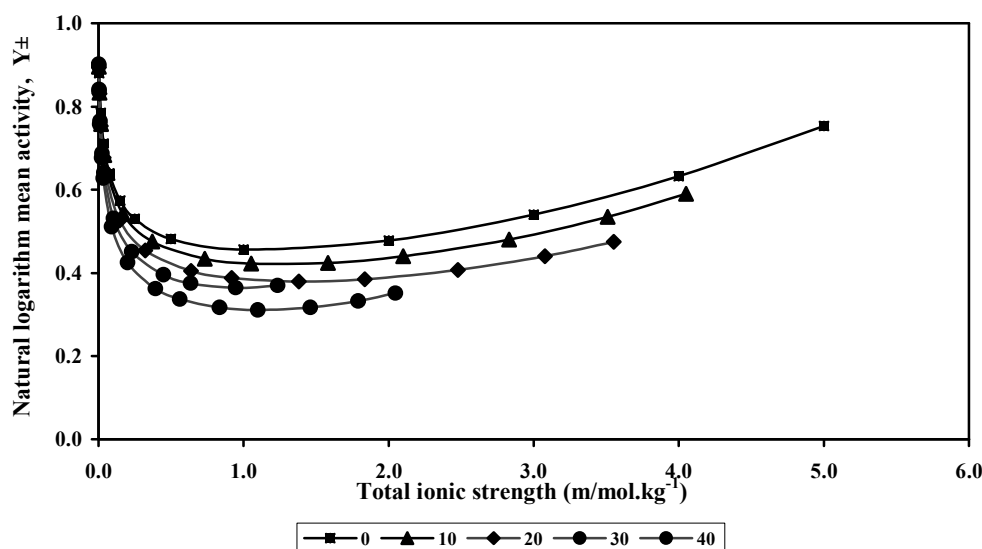


Figure 2: Values of natural logarithm mean activity (γ^{\pm}) for NiCl_2 vs. total ionic strength (m/mol kg^{-1}) in the glucose and water mixtures at 298.15 K.

N, N'- (4, 4' - ethylenebiphenyl) bis (3-methoxy salicylidene-imine **2** was utilized as an ionophore for preparation of electrodes for potentiometric coefficients to determine the NiCl_2 activity in water-glucose mixtures at 298.15K (Figure 2). This was prepared and characterized according to the reported method in the literature [18].

The mean activity coefficients of NiCl_2 in the NiCl_2 -glucose-water system were determined by a potentiometric method using a solvent polymeric ion-selective membrane electrode and Ag-AgCl electrodes at 298.15 K. The experimental data were correlated with Pitzer ion-interaction model. The adjustable parameters for each of the investigated systems were determined. It can be concluded that based on the Pitzer ion-interaction model, was filled satisfactory. The obtained Pitzer parameter was used for the evaluation of the other thermodynamic properties such as osmotic coefficients and excess Gibbs free energy.

5. References

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4. Conclusions

Thirteen color symmetry multidentate Schiff base ligands **1-13** were designed on the base of *N,N'*-(4,4'-ethylenebiphenyl)bis-3-methoxy salicylideneimine either as color or a potential ligands to bind them to the various transition metals detection at trace levels in real-world sample containing K, Ag(I), Cu(II), Sr (II) Co (II) and Ni(II) has been synthesized and their structures was characterized.

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