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Introduction. The essence of the invention consists in obtaining a one-dimensional coordination polymer of Cd(II) based on the azine bridge ligand, 1,2-bis(pyridin-4-ylmethylene)hydrazine (4-bphz), and deprotonated 2-aminobenzoic acid (2-aba) namely $[\text{Cd}(2\text{-aba})_2(4\text{-bphz})]_n \cdot 0.75n(\text{dmf})$, (C) which shows photoluminescent sensitivity in the process of exchanging or removing solvent molecules (dimethylformamide) from the cavities of the compound. At the same time, the polymeric structure is preserved in the process of exchanging or desolvation the solvent molecules. This compound exhibits selective photoluminescent activity when exchanging or removing guest molecules from the cavities of the polymer structure following changes in the intensity or displacement of the emission bands in the visible spectrum. The compound shows photoluminescence sensitivity for ethanol guest molecules, which is highlighted in the visible spectrum by significantly higher emission intensities compared to other guest species, which may serve for possible applications as a sensor for detecting ethanol molecules.

Crystal Structure. Compound crystallizes in the form of a ladder-type coordination chain, with the binuclear $[\text{Cd}_2(\text{CO}_2)_4]$ secondary building units (SBU) as ladder steps. The asymmetric unit comprises two Cd(II) atoms, four 2-aba residues, and two 4-bphz ligands as components of two chemically identical but crystallographically unique ladder-type coordination chains (Fig. 1a). The criss-cross packing of coordination chains results in the channel voids decorated with phenyl rings of the aba residues and occupied by the dmf guest molecules. The guest-accessible channels comprise 18.6% or 542.6 \AA^3 of the unit cell volume (Fig. 1b).

Solvent-exchange properties. The favorable criss-cross packing of double chains in compound led to the formation of channels where the dmf guest molecules are located, this allowed us to study solvent-exchange properties. The crystals were immersed into solvents MeOH, EtOH, and H_2O . The changes in the compound were examined by IR spectroscopy and XRPD analysis (Fig. 2). Upon sucking the crystals into solvents, the recorded IR spectra clearly indicated that the DMF molecules were substituted with the respective solvent molecules. The comparison of XRPD patterns reveals that compound retains its crystallinity. For reference, the desolvated form C-d was also obtained by heating compound C under vacuum.

Photoluminescence Properties. The recorded emission spectra show distinctive differences that reveal the sensitivity of this compound to the substitution of guest molecules in its cavities (Fig. 3). It is noteworthy that the C-EtOH product has an intensity about 100 times higher than the C-MeOH product, which indicates that the compound shows a high selectivity for ethanol molecules. These measurements reveal that the compound shows luminescent properties and can be used in the field of sensors to detect small guest molecules by the mechanism of substitution of dimethylformamide molecules in the cavities of the compound.

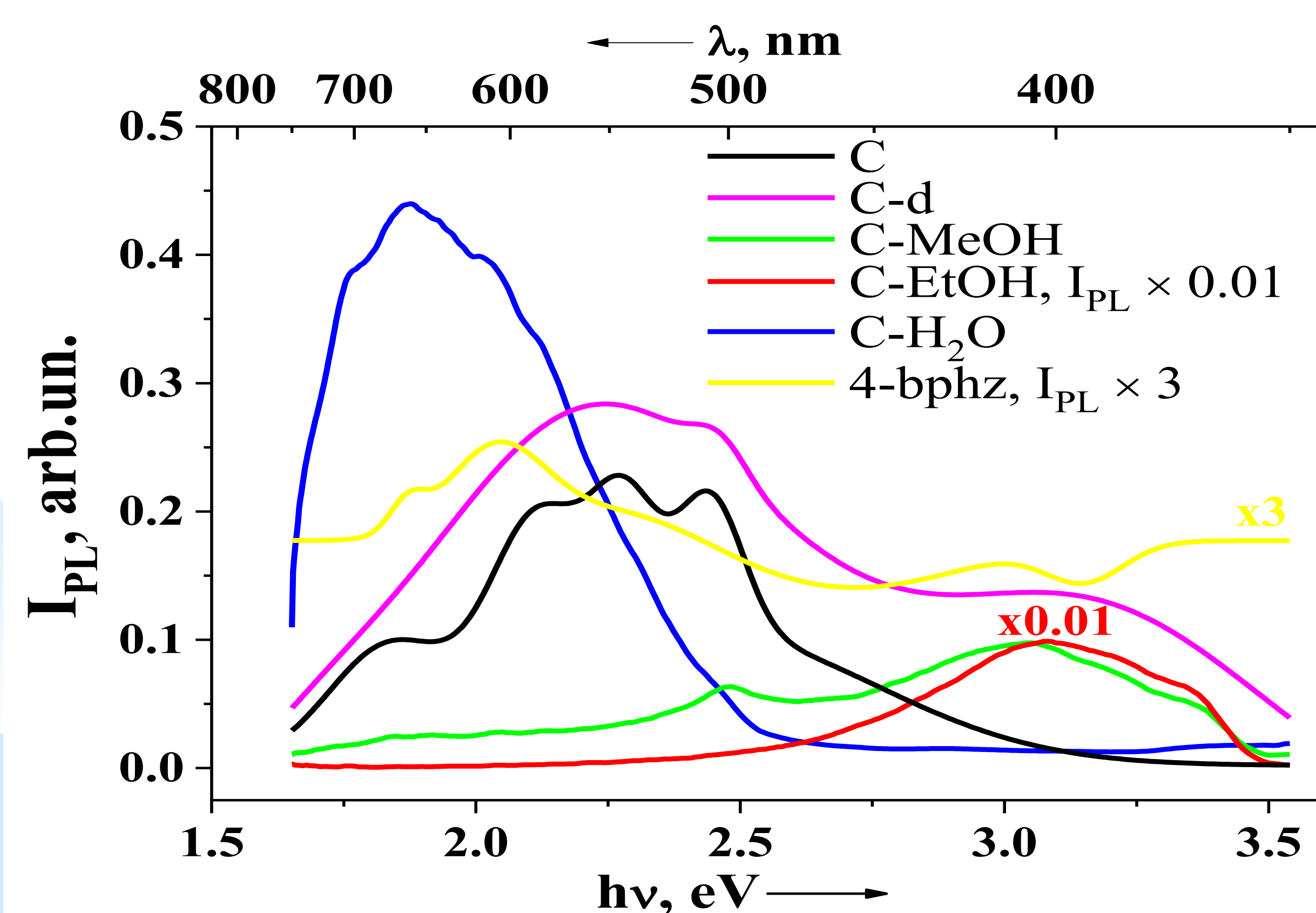


Fig. 3. Solid-state emission plots for compound C and solvent-exchange products.

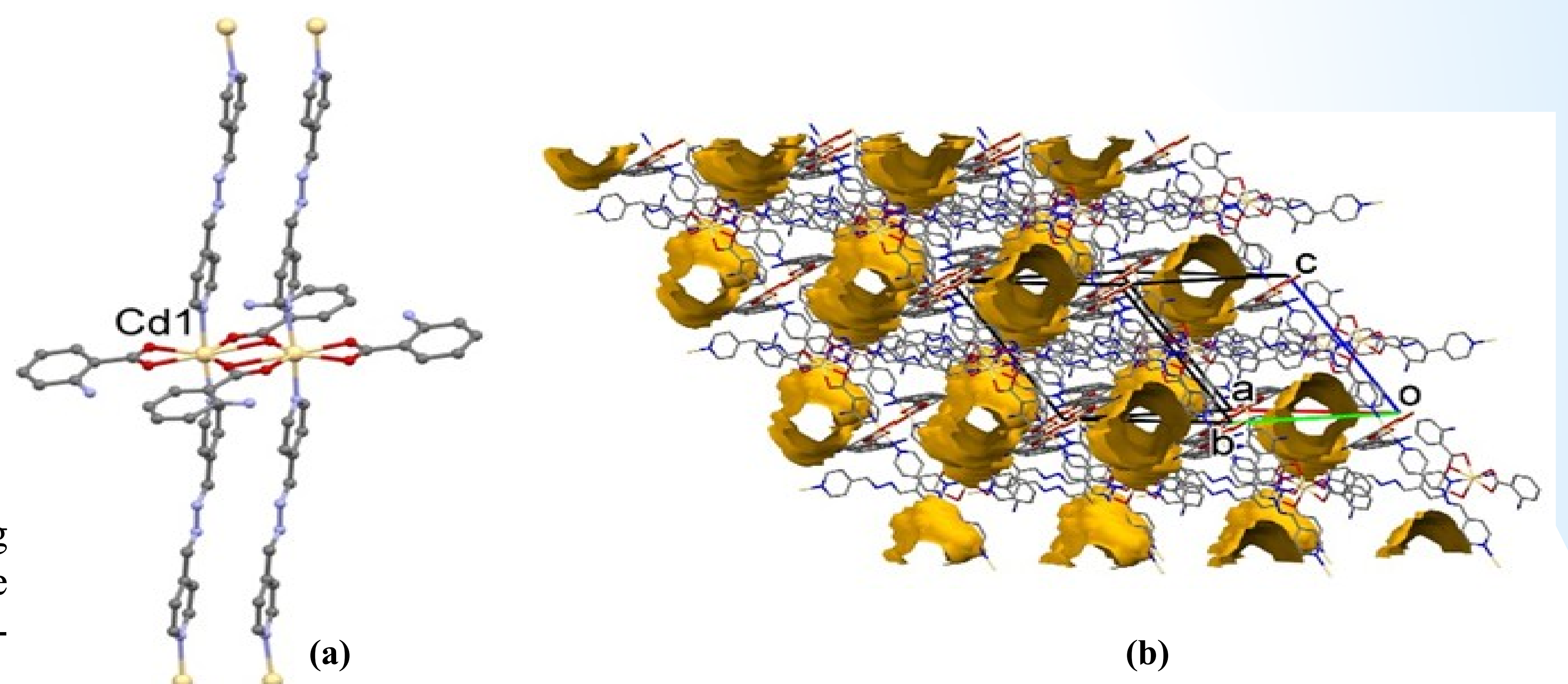


Fig. 1. (a) Fragment of coordination chain; (b) Wave-like SAVs shown in yellow.

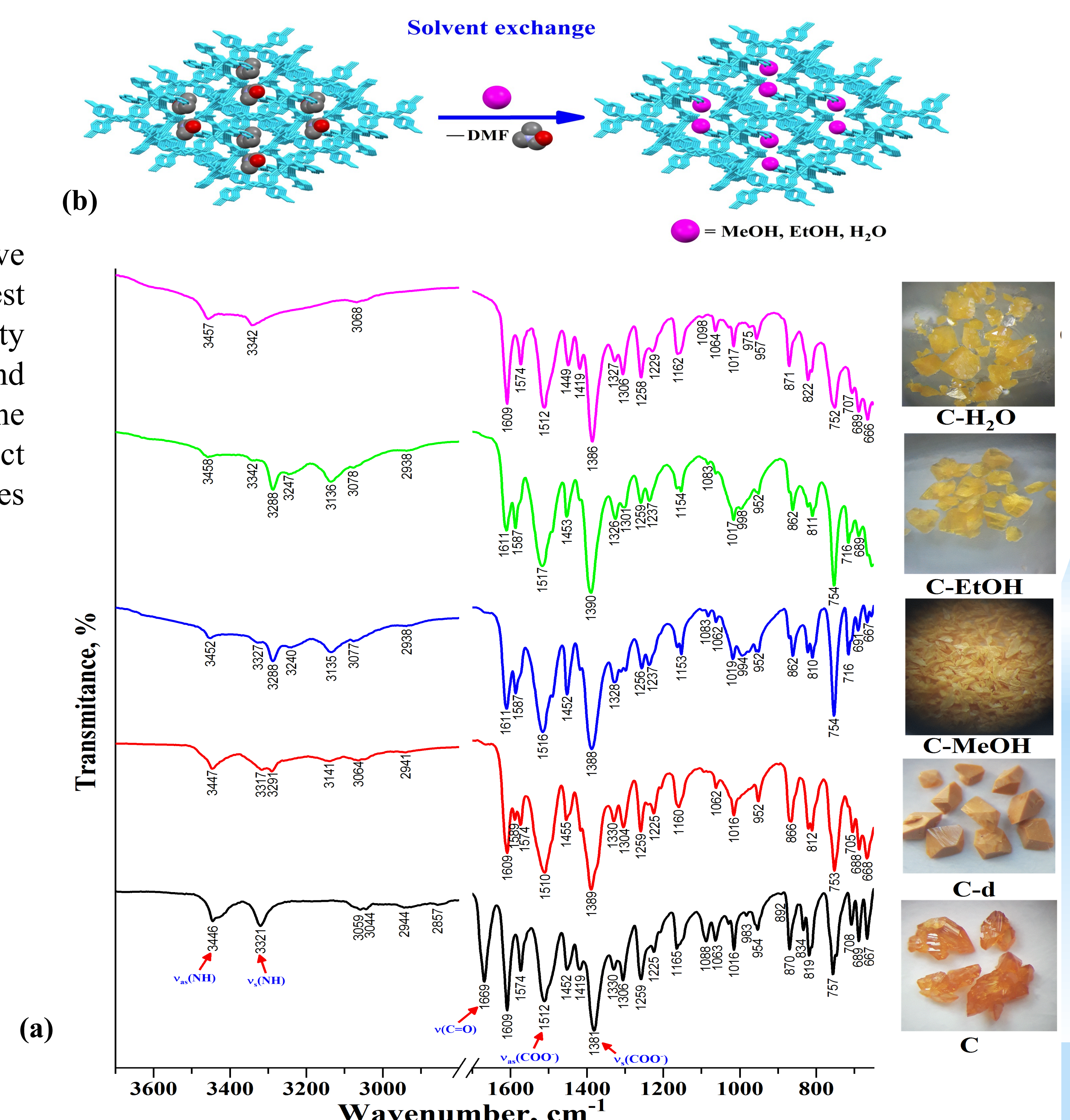


Fig. 2. (a) IR spectra and crystal images of compound C and solvent-exchange products; (b) Illustration of solvent-exchange process.